ELECTRICAL REVIEW

30th OCTOBER, 1953

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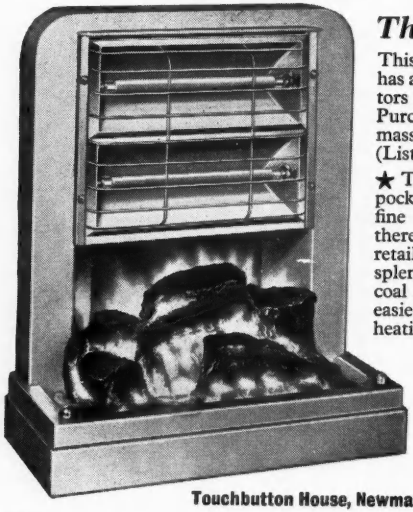

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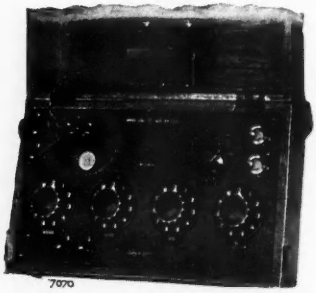

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ELECTRICAL REVIEW 30th OCTOBER, 1953

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. 153 • NO. 18

Electrical Technicians

AS one of the three principal trading activities of this country, the electrical industry has more than the ordinary responsibility of ensuring that all who can contribute to its advance shall have the fullest opportunities of doing so. A fundamental prerequisite is that their education and training are on the most suitable lines. Present methods fall very short of the ideal, particularly in respect of the group of men concerned with the more immediately practical application of technology and with supervisory duties; these are designated " technicians " in the relevant reports of the Institution of Electrical Engineers and outnumber the " professional " group by at least five to one. For these no suitable course of instruction exists at present. The convenient distinction between the two groups, however, carries with it a risk of serious misunderstanding, which may adversely affect the recruiting of technicians.

Actually the line of demarcation can hardly be a rigid one in practice, and opportunities will no doubt be taken by technicians with a bent for more theoretical aspects to become professional engineers by further study, just as many of the latter group will be attracted to the more practical work of technicians. The term " technicians " itself seems unlikely to appeal to a youth who aspires to follow the calling of engineer, with which is associated so many great names of the past. Their natural aptitude, he may feel, was perhaps more akin to his own than that now necessary to exploit fully the rapidly expanding discoveries of science, which comes more within the scope of the professional grade. That is a sentiment which cannot be disregarded.

An unfortunate consequence of misunderstanding of the status of technicians was pointed out by Mr. C. T. Melling in his presidential address to the Association of Supervising Electrical Engineers, last week, a report of which appears on page 985. In the absence

of training facilities directly aimed at equipping them technologically for their own important functions, with less severe requirements in certain aspects, e.g. in physics and mathematics, technicians may use their time and energy to reach higher theoretical standards than are necessary. Disappointment is likely to follow inability to pass examinations devised for quite another purpose. Actually the qualifications of a technician are positive and should receive proper recognition as such. A scheme to this end, we understand, is being worked out by the Association in conjunction with the Institution of Electrical Engineers and other bodies. There are many difficulties to be overcome in formulating such a scheme, but the need is immediate.

REORGANIZATION AND SALARIES

The decision of the London Electricity Board to convert one of its Sub-Areas into a " two-tier " organization, replacing it by two large Districts, has led to a question about the salaries of the engineers involved in the change. It is the view of the employers' side of the National Joint Board that that body should deal with the matter and give guidance to the District Joint Boards. The employee members think, however, that the subject is one for the London District Joint Board to deal with by assessing provisional salaries for the occupants of positions in the reorganized area, who are said to be still receiving their previous salaries. A sub-committee of the N.J.B. has now been appointed to examine the matter and advise on a method of approach by the Board " in meeting the difficulties arising from the changed conditions."

FUTURE NEEDS

Speaking at a recent ceremony to commemorate the fiftieth anniversary of the commissioning of the first (" giant ") 5,000 kW set at the Fisk station of the Commonwealth Edison Co., Mr. Ralph J. Cordirer, president of the American General Electric Co., predicted that within ten years American utilities would be forced to double their generating capacities. And yet there are people in this country who, while advocating emulation of American methods, decry the British Electricity Authority's plant construction programme which (having regard to obsolescence) falls short of this advance.

ATOMIC POWER " RACE "

News from America that a nuclear power plant of not less than 60 MW is expected to be in operation in three or four years' time marks another definite step towards the " peaceful " use of atomic energy. Mr. T. Murray, a member of the Atomic Energy Commission, has spoken of a new kind of competition with Russia—an atomic power race. It has been decided to build the new plant because there is much that can be learned only by " building and operating." Great Britain's coal situation makes us even more interested than the United States in the development of this " new " form of energy and we are therefore taking a prominent part in the atomic power " race " as this week's debate in Parliament showed.

COPPER PRICES

When the Ministry of Materials " released " copper in August the price immediately fell by about £50 a ton. We noted then that stocks had been run down in anticipation of the decrease and revived purchases would put a brake on further price decline. This has happened and the cash price has moved back nearer to the level at which it stood before the resumption of private trading. The situation has also been influenced by a hold-up in Chilean supplies. Judging by forward quotations, however, it appears that the trend is likely to be downward again.

Steel Strip Cold Rolling

Pickling Processes at Port Talbot

IN the *Electrical Review* of 19th and 26th December, 1952, we described the electrical applications to hot steel strip rolling as we saw them at the Abbey section of the new large integrated steelworks at Port Talbot of the Steel Company of Wales, Ltd. We now propose to deal with the applications to the processes relating to steel strip cold rolling at the Abbey section as a further contribution to the series of articles which was started with a description of the completely new electrical distribution system for the whole of the Port Talbot works in our issue of 2nd November, 1951.

In the last published article we saw the hot strip coils delivered from the coilers to the hot coil stocking ground. Coils are taken from stock by means of one of three 20 ton moving-cab steelworks overhead travelling cranes which, in common with all the cranes in the cold rolling section, are Adamson Alliance equipments each with three motors.

Each coil is placed on a down-ender which turns the coil on to its side to allow it to run on to an inclined ramp on which there are three coil stops which are compressed-air operated under solenoid control. This down-ender really constitutes the entry end of the pickle line in which the surface scale is removed during the continuous passage of the strip through four enclosed tanks containing weak solutions of sulphuric acid. The down-ender is hydraulically operated and the oil pressure is created by a self-contained motor driven pump.

The coil is gripped by a mandrel at the lower end of the ramp and its end is fed into the processer which is a machine which first gives the strip a violent turn round rolls to remove loose surface scale and then passes it through a series of leveller rolls.

The main drive of the processer is a Metrovick 325 h.p. 300 V 1,100 r.p.m. shunt wound motor which operates under

Above: **Coils are taken from the hot coil stocking ground by one of three 20 ton moving-cab cranes; on right is the conveyor feeding hot rolled coils to stock**

Ward-Leonard control from its own generator. This motor drives both the roll which gives the strip the violent turn and the leveller rolls. The ragged lead-in end of the coil is removed by an up-cut shear driven by a Metrovick 50 h.p. 415 V 540 r.p.m. high torque s.c. motor with local control.

Next in the line is a welding machine by which the ends of the coils are butt welded in order to increase the length and hence weight of the coil. The welder consists of two pairs of jaws which accommodate the maximum width of the strip, i.e., 74in. Each pair of jaws grips the strip vertically and solidly. One pair remains in a stationary position while the other pair moves horizontally so as to bring one end of the strip up to make contact with the strip end of the other coil. The jaws constitute dies or electrodes which carry the current to the work (strip). A.c. is employed for the welding operation and is supplied by means of a l.v. transformer incorporated in the welding machine which was supplied by the British Federal and Machine Co., Ltd.

The welding operation is controlled in a definite sequence, and governing the main circuit is a 5,000 A contactor by Contactor Switchgear, Ltd. Immediately after the welding machine is a scarfer which removes the excess welding material; it consists of a number of milling tools which operate in line with the weld, thus leaving the strip in suitable form for cold rolling.

It is necessary that the strip should pass through the pickling tanks without interruption, so the various coils are " stitched " end to end immediately after the welding machine. The stitching is a mechanical pressing and folding operation and the drive is a duplicate of that of the up-cut shear.

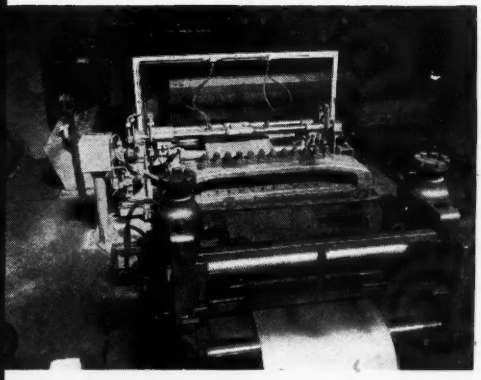
Immediately after the stitchers is a pair of pinch rolls which propel the strip into the looping pit. These pinch rolls are driven by a Metrovick 87 h.p. 300 V 890 r.p.m. shunt motor which is Ward-Leonard controlled. The generator of this drive and the generator for the processer are both incorporated in one m.g. set which is driven by a Metrovick 530 h.p. 3·3 kV 980 r.p.m. s.c. motor.

Next in the pickling line is a deep looping pit which is a little wider than the maximum width of the strip and accommodates sufficient reserve of strip to allow the exit end of the pickling line to be fed continuously while the entry end is stopped for the various stationary processes described, i.e., welding, stitching, etc.

The drives so far mentioned constitute the entry section of the pickling line. There are two control desks for this section —one at the processer, which allows the strip to be fed into the line, and the main desk near the welding machine, from which is controlled all the running at the entry end of the line. There are three points at which the drive can be locally inched, viz.:—(*a*) the up-cut shear No. 1, (*b*) the welder, and (*c*) the stitcher.

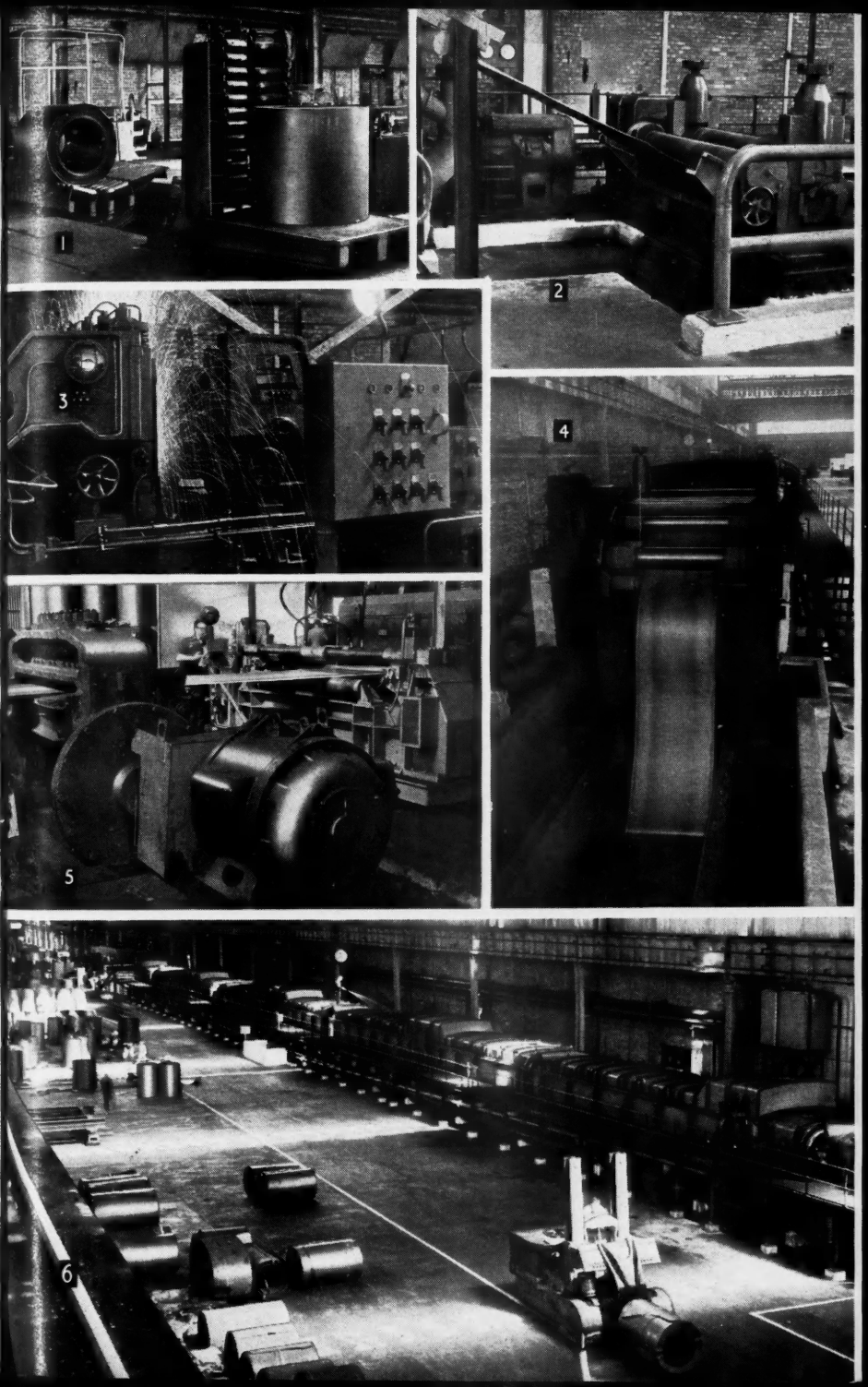
The speed of the strip through the entry end of the pickling line, which is necessarily higher than that of the strip exit end, is 750ft/min maximum, while the exit end speed is 350ft/min maximum, according to the condition of the strip.

At the beginning of the exit end of the



Left: **Looking back at the pinch rolls which propel the strip into the looping pit; the stitcher and (rear) the welder**

Right: **(1) Each coil is placed vertically on a down-ender near the delivery end of the pickling line; horizontally disposed coil on tilter at beginning of ramp. (2) The strip is fed into a processer which gives the material a violent turn to remove scale. (3) The welder on the pickling line has two " electrode " jaws which will accommodate strip up to 74in wide. (4) The looping pit accommodates a reserve of material to permit continuous feeding into the pickling tanks. (5) Stitching the strip ends is a pressing and folding operation. (6) For the actual pickling the strip is drawn through weak acid in four long enclosed tanks**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2
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line is a pair of pinch rolls which lift the strip out of the looping pit and pass it into the first of the four pickling tanks. The drive of these pinch rolls is a duplicate of that of the pinch rolls in the entry end of the line.

In its passage forward the strip loops down into each tank from rolls (driven or idle, according to their disposition). The extent of the loops in the tanks is governed by the position of a dancing roll which bears on the strip in the first tank. The vertical movement of this dancing roll operates a rheostat which controls the generator voltage supplied to pinch rolls No. 3, yet to be described. When the strip issues from the last (No. 4) tank it is washed with hot and cold water sprays. The washed strip is next passed through a drier table in which hot air is blown on to the strip by a Sturtevant fan. The driving motor for this fan is a Metrovick 85 h.p. 415 V 2,930 r.p.m. s.c. machine. The strip is drawn through the pickling tank, washers and drier by the No. 3 pinch rolls which are a duplicate in all respects of the pinch rolls previously described.

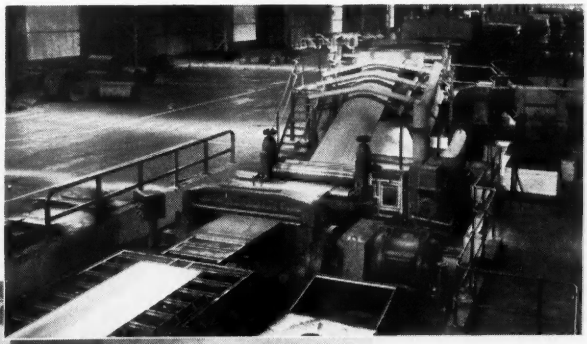
Next on the line is an up-cut shear whose purpose is to cut out the stitch. Electrically and mechanically this is a duplicate of the up-cut shear at the entry end of the line. Finally on the pickling line is the up-coiler for rewinding the strip into the larger coils, which can weigh up to about 18 tons, for the subsequent operations. The up-coiler drive is a duplicate of the pinch roll drives.

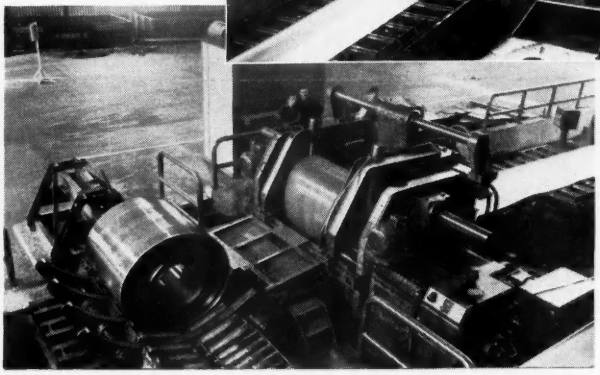
Situated between the up-cut shear and the up-coiler is a desk from which the exit end drives are controlled. There are also local control cabinets for inching purposes at pinch rolls No. 2 (out of the looping pit) and at the up-cut shear No. 2 (at the exit end).

The Ward-Leonard generators for the drives of pinch rolls Nos. 2 and 3 and for the up-coiler are all incorporated in one m.g. set which is driven by a Metrovick 320 h.p. 3·3 kV 980 r.p.m. s.c. motor. This set is situated in a basement of the building, which also houses the a.c. and d.c. contactor gear associated with the exit end of the line. The a.c. contactor gear is of Allen West manufacture and the d.c. equipment is of Metrovick production.

Associated with the pickling line there are many small drives for auxiliary processes.

From the up-coiler on the exit end of the pickling line the coil is deposited on a gravity conveyor which carries it via a weighing scale to a pickling coil stocking ground.





Above: **At the delivery end of the pickling line pinch rolls draw the strip through the acid tanks and up-cut shears sever the strip as required**

Left: **Finally on the pickling line is the up-coiler which rewinds the strip into coils of up to 18 tons weight; drive in pit**

NEW BOOKS

Boiler House Practice. By J. N. Williams. Pp. 592; figs. 238; index. Allen & Unwin, Ltd., 40, Museum Street, London, W.C.1. Price 60s.

This book, which supersedes the author's previous work "Steam Generation," contains some twenty-five chapters. Some idea of the ground covered, which includes both small and large boiler plants, will be gathered from the chapters included, namely:—

Combustion, theory and practice; heat transmission; steam; shell boilers; furnaces and grates, boiler operation; water-tube boilers and their operation; mechanical stokers: small and large; super-heaters, economizers and air heaters; coal: storage, handling and characteristics; coke and coke breeze; oil-fired boilers; pulverized fuel firing; boiler control; water and its treatment; boiler feeding; refractory, insulating materials and lagging; chimney emissions; flue gas cleaning; cleaning and maintenance of boilers; measurements and tests; fuel economy; and appendix.

Many of the chapters are of a descriptive nature but where calculations are deemed necessary the author has included them. The theory of combustion follows the standard lines in respect of fundamental formulæ and the practice of combustion gives a very concise but instructive introduction to this important aspect of boiler house practice. Heat transmission and associated problems have received considerable attention during recent years and the information given, although meagre, should prove useful.

The author states that some 25 per cent of the total coal output is burned annually in shell boilers so that the sixty or more pages devoted to these plants should prove most helpful to power plant engineers engaged in the medium size and relatively small industries. Water-tube boiler operation is dealt with at some length and some up-to-date information is given concerning deposits and corrosion.

Another useful chapter deals with coal and its characteristics and coke and coke breeze are also mentioned. Oil-fired boilers and pulverized fuel firing are described in detail and mention is made of the cyclone furnace which to date has not been applied in this country although one such plant is being erected. In such a comprehensive work it is a pity that the peat-fired boiler plant has not been included.

The inclusion of a bibliography of the more important books as well as papers presented to professional institutions in recent years on sections of the work covered by this book would also prove most helpful. The book is very well produced and the many illustrations enhance its value as a work of reference and it can be recommended to all engaged or interested in the subject.—T.H.C.

Information Theory and its Engineering Applications. By D. A. Bell, M.A., B.Sc., M.I.E.E. Pp. 138; figs. and index. Sir Isaac Pitman & Son, Ltd., Parker Street, Kingsway, London, W.C.2. Price 20s.

Cybernetics is the study of the effect of information upon control action and there has been much work recently on the electrical engineering aspect of this subject, with particular reference to transmission of impulses, e.g., in the morse and five unit code. This book is a concise treatise on the subject. The non-mathematical reader would be advised to accept much of the theory, but the general text is simply explained.

The contents include an introduction to binary systems; entropy applied to information (with Maxwell's Demon—or, as the author suggests, *gremlin*—in the middle); band width and signalling speed; signal-to-noise ratio and coding; also an extremely interesting chapter on practical applications, including colour television, and Wiener's theory of filtering.

The appendices cover the thermodynamical theory of entropy and information (the negative of entropy), a note on the English language as to its possible information content, Fourier transforms, and the morse code. In such an important work, we should have liked to have seen a little more explanation of the mathematics, which will tend to frighten some readers who would otherwise find this an enjoyable book.—E.H.S.

Book Received

The M.K.S. System of Units. By T. McGreevy, M.Sc.Tech., M.I.E.E. Pp. 283; figs. and index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 21s.

Clamp for straight line working on 33 kV lines and the same shown on a Pilkington No. 1053 insulator with the conductor in position ready for tensioning

Overhead Line Erection

Improved Method of Mounting Tensioned Conductors

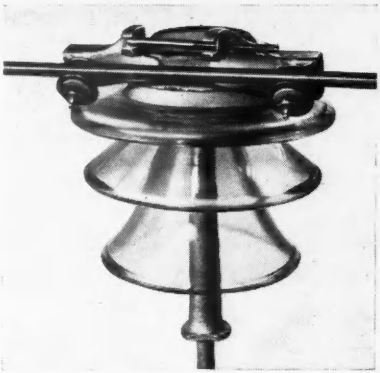
A MEANS of overcoming the difficulties of lifting conductors under tension from the running blocks on the cross arms of transmission line poles during overhead line erection, particularly since the modification of cross trees, is being introduced by the Eureka Engineering Co. in the form of a series of special clamps carrying running blocks. These clamps also lessen the tendency of linesmen to tension conductors placed actually on the insulators, which results from the difficulty of making full use of the safety belt when lifting tensioned conductors. The clamps were designed in the first place by Mr. T. Earle, a member of the staff of the British Electricity Authority, and formerly on the staff of the South Eastern Electricity Board.

Straight Run Clamp

Three types of clamps are so far in production. The simplest one, the " Tearl " clamp, is designed for straight runs on 33 kV lines with pin type insulators (Pilkington Armourlight No. 1053) with a groove in the top of the insulator cap in which the conductor rests. The clamp is of the split type, in two halves, with clamping lugs and bolts and wing-nuts for clamping up in the circular groove in the side of the insulator cap. Centrally on each half of the clamp there projects upwards an ear which carries a roller; the projection is such that when the conductor is actually on the rollers in the clamped position it is about $\frac{1}{4}$in clear of the insulator surface, providing sufficient room for taping. The conductor is, of course, tensioned while it is on the rollers, and after tensioning the clamp is released so that it is lowered below the containing groove, with the result that the conductor automatically falls into the top groove of the insulator cap. The clamps carrying them are usually fitted to the insulators before the poles are erected.

Angle Clamp

The second type, the angle clamp, is intended for use on the same type of insulator, but for angle work. In this case the rollers project downwards from ears on one side of the clamp near one of the clamp splitting points. The rollers hold the conductor clear of the side groove in the insulator cap, so that taping of the conductor at the contact point can be carried out in much the same way as with the top mounted conductor. Again the conductor is tensioned while it is on the



Angle clamp for 33 kV line work and the tensioning set-up on a Pilkington insulator

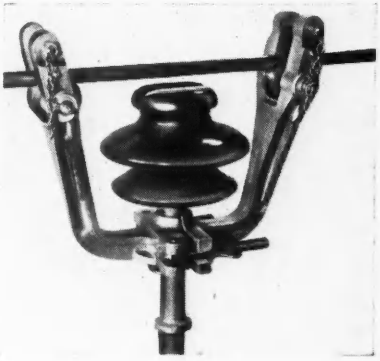
rollers, and afterwards the clamp is loosened and thus lowered below the insulator cap side groove, so that the conductor then draws in longitudinally and takes up its position at the required point on the periphery of the side groove in the insulator cap.

Universal Clamp

The third or " universal " type of clamp is intended for straight line work on 11 kV lines. It is not restricted to any one type of insulator and can therefore be used on all lines employing pin type insulators. The clamping in this case is effected on the pin itself below the insulator proper, and from this point two fairly long arms project upwards on opposite sides of the insulator, each arm carrying a roller, so that when in the tensioned position on the rollers the conductor is just above the top groove in the insulator in much the same way as is the case in the straight line clamp for 33 kV lines. After the conductor has been taped the clamp is lowered down the pin and the conductor takes up its position in the insulator groove.

It will be appreciated that the time saved by the use of these clamps is very considerable, and that much thought has been given to the contours of the pulleys to prevent the conductors riding out. The clamps have been tested by two Electricity Board Sub-Areas and found to be quite satisfactory. The castings are made of high-tensile aluminium alloy and adequate arrangements are made for the lubrication of the rollers.

Clamps for 33 kV lines are at the moment restricted to use on the Pilkington No. 1053 insulator, but we are told that universal clamps similar to the type used on 11 kV lines will be available shortly.



Universal clamping equipment for 11 kV lines and the equipment mounted on an insulator at the time of tensioning

ENGINEERING NEWS FROM INDIA

By an Indian Correspondent

THE Government of India has signed an agreement with the German firms Krupps and Demag for the erection of a £52 million steel plant with an initial capacity of 500,000 tons to be expanded eventually to one million tons. The German combine, which will also act as technical consultants for a fixed fee of about £1·5 million, will provide £7 million of the share capital, the rest being provided by the Government which has already approached the World Bank for a loan of £15 million. The German investment will be for a period of ten years with option to either side to continue the association for a further similar period. The site of the plant has not yet been decided upon but it will most certainly be near the rich iron-ore deposits of north-east India.

Plans are also afoot for the establishment of another unit of a similar capacity and a Japanese economic mission now in the country has announced that India and Japan are considering the question of setting up the new steel plant as a joint venture.

Electrical Plant Manufacture

Negotiations for German technical assistance in the establishment of a plant to produce heavy electrical equipment have been under way for some time with the Siemens concern, according to the Ministry of Production. Six representatives, headed by Dr. Kunz, are studying market conditions and production facilities with a view to their participation in the project. They will submit a report as soon as their discussions with the various authorities, including the Indian Railways, are over. The Railway Board is anxious to go ahead with its schemes for electrification of the railways but has been held up through lack of foreign exchange.

The foundation stone of an up-to-date institute for research and advanced study in electronics was laid by the Prime Minister, Mr. Nehru, on 21st September at Pilani, Rajastan. The centre is one of the chain of eleven research laboratories set up by the Government since the war under the auspices of the Council of Industrial and Scientific Research. The Electronics Institute envisages a capital expenditure of £400,000 and an annual expenditure of about £45,000. Special attention will be devoted to the utilization of indigenous raw materials in the manufacture of components, the building of standard electronic instruments for test purposes, and the application of electronics in metallurgy. It will have an initial staff of 102, of whom 63 will be technical.

Preference for Water Power

Work on the two oil refineries in Bombay is proceeding but the plan for a new thermal power station to supply power to them is still hanging fire. Tatas propose to install two units with a total rated capacity of 100,000 kW but the Government of Bombay is hesitating to sanction this lest the relatively costly thermal plant should compromise it in its plans for a new hydro-electric station at Koyna. This project, with an initial capacity of 240,000 kW, is estimated to cost nearly £30 million in the first stage. A grant of £3 million has been made by the Planning Commission towards preliminary investigations and a detailed survey, and there is a likelihood of a start being made on construction by the beginning of next year. In magnitude, it is on a par with such big projects as those at Hirakud and Bhakra-Nangal, and should sufficient funds be available for its execution, the plan for the Tata thermal plant will have to be shelved or reduced to one 50,000 kW unit.

New Walsall Trolley-Buses

WALSALL Transport Department will lead the country next year with the introduction of the first two-axle 30ft trolley-buses in England. Within twelve months it is expected that ten of the new vehicles will be operating on local services. The new two-axle design is expected to decrease construction and running costs materially.

The principle of the new design—first suggested by Mr. R. E. Cox, the Walsall transport manager—has already been approved by the Ministry of Transport. Details of the final design have not yet, however, been agreed.

Domestic Heat Pump

Experience with the First Dual-Purpose Installation in Bristol

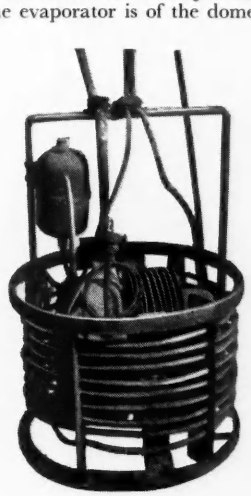
By G. O. McCLEAN, M.Eng., A.M.I.E.E.*

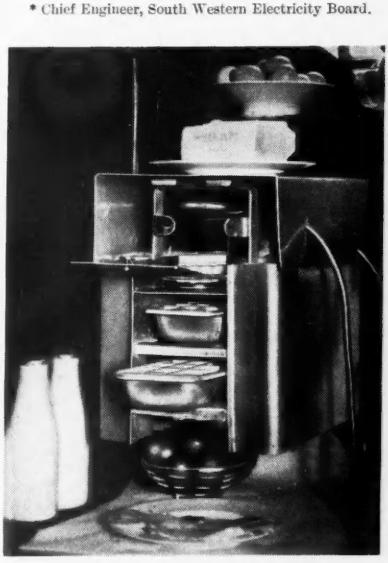
FOLLOWING on the successful experiment with a small heat pump using the compressor unit of a standard English Electric domestic refrigerator at Electricity House, Bristol (described in the *Electrical Review* of 6th February, 1953), the South Western Electricity Board agreed to the installation of one or two units in houses owned by members of the staff to gauge the efficacy of larder cooling and obtain the views of the housewives using them. The first installation has now completed three months' operation, and the housewife has publicly (B.B.C. "Week in the West," 25.9.53) expressed her satisfaction with the performance, and particularly with the value of the refrigerated larder in the hottest days of August.

The unit is, of course, very similar to the earlier one described in this journal, except that the evaporator is of the domestic type with removable ice trays, giving facilities for making iced puddings, etc. The small compressor unit, after three months' use last winter in the Electricity House experiment, was placed in a standard 30 gallon galvanized cylinder in which a 15in manhole was provided to allow the entry of the compressor and surrounding condenser coil. The cylinder was placed in a corner of a small bedroom immediately above the larder, and below the cold water supply tank in the roof space. It was insulated with 2in of 85 per cent magnesia, finished with hard setting composition and then enamelled to match the woodwork in the room.

The finished cylinder was connected in parallel with the existing hot water system, feeding all the hot water taps in the house. It was arranged that a small water meter

* Chief Engineer, South Western Electricity Board.



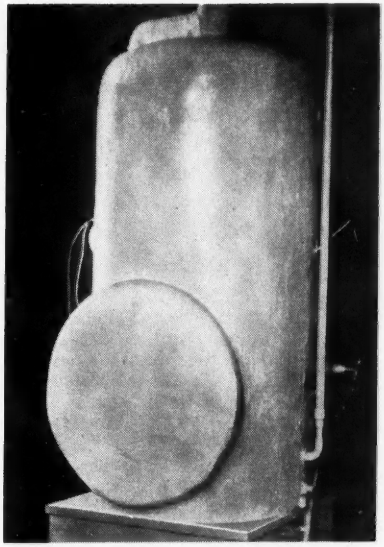


Compressor unit after three months' continuous use and (right) heat pump domestic-type evaporator in larder

should be fitted in the cold inlet pipe. A unit meter was connected in the electrical circuit, while thermometer pockets were let into the cylinder at three levels to allow output and performance ratios to be calculated. These have shown that the quantity of water drawn off has varied from 10 to 50 gallons per day, at temperatures of from 140 deg F down to 90 deg F. The net performance ratios calculated on a daily basis have varied from 1·5 to 2·5, but the gross ratios, allowing for losses from the cylinder and pipes, were 2·5 to 4·0.

The heavy losses causing these differences indicate that the size of cylinder may be too large for the small $\frac{1}{6}$ h.p. compressor; but a unit double the electrical size could be fitted inside, and the consumption would not necessarily be doubled if the draw-off amounts remained unchanged. The summer-months test has proved that the unit can produce satisfactory larder temperatures with an ambient temperature of 70 deg F in the rest of the house, while it is confidently expected that use during the winter months when the outside temperature is down to 40 deg will prove that sufficient heat can be picked up to give the housewife all the hot water she needs.

It is hoped that several more units will be installed in different types of property in the next twelve months, and that architects and builders who see an E.R.A. working exhibit at Olympia in the Building Exhibition (14th November–2nd December) will by their interest and demands encourage the production of a steady flow, for the householder will obtain the cheapest supply of hot water possible (about 4d a day) at the same time as having a refrigerated larder.



The finished 30-gallon cylinder was connected in parallel with the existing hot water system

Aid for Japanese Power Companies

THE International Bank for Reconstruction and Development has made three loans totalling over $40 million for the expansion of privately-owned electric power facilities in Japan. The loans will be used for the construction of three high efficiency thermal-electric power stations in central and south Japan. Increased supplies of power will help to meet the demands of industries which are expected to expand substantially during the next five years.

The loans were made to the Japan Development Bank, a government agency established in 1951, which will re-lend the proceeds of the loans to three private companies as follows: $21·5 million to the Kansai Electric Power Co.; $11·2 million to the Kyushu Electric Power Co.; and $7·5 million to the Chubu Electric Power Co. These concerns are three of nine private companies organized in 1951 to take over the operations of all electrical utilities in Japan. Together, they serve 30 per cent of the total area of Japan with about 40 per cent of the population. In 1951, they generated 37 per cent of all electric power produced in Japan.

Each of the three loans is for a term of 20 years and bears interest of 5 per cent per annum including the 1 per cent commission which, under the Bank's Articles of Agreement, is allocated to a special reserve. The Westinghouse Electric International Co. and the International General Electric Co. are prime contractors for the supply of equipment and services, being financed by the Japan Development Bank from the proceeds of the International Bank's loans. The companies have entered into arrangements with the International Bank to participate in these loans to the extent of about $6·1 million, which amount the companies will receive back out of the early maturities of the loans.

Training Technicians

A.S.E.E. Inaugural Address

As the subject of his inaugural address for a second term as president of the Association of Supervising Electrical Engineers, Mr. C. T. Melling, M.Sc. (chairman, Eastern Electricity Board) took "Education and Training in the Electrical Industry." After referring to the two reports of the Institution of Electrical Engineers on the subject, he discussed broad distinctions between the three grades of skilled workers—professional engineers, technicians and craftsmen.

Briefly the first group included those of broad education, particularly qualified in the physical sciences, coupled with sound workshop experience, who could assume personal responsibility for initiating and organizing technical work. Their entry into the profession might be either as student apprentices direct from school, technical studies being taken concurrently with practical training leading to passing appropriate examinations, or as graduate apprentices from a university or technical college. Alternatives were a "sandwich" course of practical and academic training or a probationary college apprentice course in which a year of practical training preceded a university course.

Mr. C. T. Melling

The second group carried out techniques which were either common knowledge among experts in a particular branch or specially prescribed by professional engineers. Technicians were concerned with "how it works" rather than with "why it works," which distinguished professional engineers, but their training followed similar lines, except that the entrant might be younger and might not have attained the same educational standard. Their later training was not so much concerned with theoretical study as with the application of scientific method and technology to practical purposes. It was not intended to lead to qualifications in professional engineering with their more severe requirements in mathematics and physics, but those could be attained later if required by individuals. Normally technicians would attend a technical college and acquire the Ordinary National Certificate in Electrical Engineering or a suitable alternative. They could keep in touch with developments in other branches than their own through technical meetings and study of the technical Press. During apprenticeship personal instruction should be given by experienced men of all grades, enabling them later to supervise the work of craftsmen efficiently and with understanding. Transfers from the craft apprenticeship courses, designed to give enough knowledge of electrical theory for manual processes, should be open to all willing and able to take advantage of educational opportunities.

The A.S.E.E. had taken a leading part in the training of technicians by lectures throughout the country, and the establishment in 1945 of the Swann Diploma marked a noteworthy step. The recent recognition of the Association by the Institution of Electrical Engineers as the appropriate body to cater for electrical technicians in utilization indicated expanding scope.

Accidents in New Zealand

A COMMITTEE set up in New Zealand to investigate accidents in the electrical industry, and safety precautions, has reported to the Government. The committee comprised representatives of the Government Departments concerned, supply authorities and the unions. It found that, over a five-year period, nine out of every ten electrical accidents arose from a failure to observe proper safety precautions, either by the person killed or injured, or by someone else. The committee's recommendations cover supervision of workers on dangerous jobs; a scheme of instruction in safety; a simple set of safety rules; and the adoption of resuscitation measures.

Magnetic Amplifiers

I.E.E. Measurements Section Chairman's Address

As the subject of his inaugural address last week as chairman of the Institution of Electrical Engineers Measurements Section, Mr. J. F. Coales (Cambridge University Engineering Department), chose "Magnetic Amplifiers." The first use in this country of the non-linearity of the magnetization curves of transformer cores for testing was, he believed, made by his father in 1907–8. This and more recent bridge methods depended on the change with magnetizing field of incremental permeability of the magnetic core.

The advent of high permeability magnetic materials with a sharp knee in the magnetization curve had resulted in the development of the transductor, which consisted essentially of two cores driven far into saturation in each half-cycle of the supply frequency. Transductors were thus d.c. amplifiers with core magnetization biased by series input windings and with excitation windings in opposition. In operation they were similar to a pair of grid-controlled rectifiers in that, upon one core becoming saturated, the inductances of their windings fell and the currents rapidly increased. Winding impedances remained small until the current through them dropped to a very small value as a result of the excitation e.m.f. becoming almost zero.

The current through the load was significant only when one core alone was saturated, producing a tight coupling of the input and excitation circuits, between which an ampere-turn balance must be maintained. Thus the current gain was always equal to the ratio of the number of turns of excitation and input windings, the transductor being equivalent to a current amplifier of high gain with 100 per cent negative feedback.

Power gain could be increased by feeding the rectified load back to the input in the positive sense ("self-excitation"), thus reducing linear range and increasing the drift. Transient response was thereby much improved, since, independently of the amount of feedback, its time constant was almost directly proportionate to current gain, whereas power gain was proportionate to the square of current gain. Self-excitation of 100 per cent could be more simply achieved for parallel connected transductors by using rectifiers to suppress in each half cycle the excitation current in non-saturated windings. Self-excitation resulted in increased standing current and so in reduction of stability.

The chief cause of drift was change of rectifier characteristics, and the smallest input signal that could be discriminated was about 10^{-9} W. By connecting the load to additional windings, magnetically similar to the input windings, and suppressing the even harmonics otherwise induced in the input circuit by a high impedance, these harmonics could be forced into the load circuit, which then had no standing current, but—since ampere-turn balance must be maintained—had the same signal current as before. This resulted in greatly improved stability and, by the use of elaborate valve circuits, a short term stability of 10^{-18} W. If, however, magnetic modulation were followed by a magnetic amplifier, since the greatest gain obtainable in the modulator was about 10^3, the best stability at present was about 10^{-12} W.

Brunei Five-Year Plan

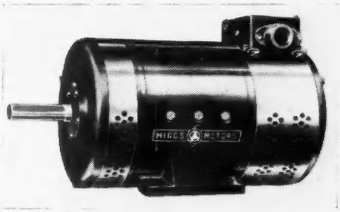
A FIVE-YEAR development plan for the State has been approved for Brunei, N.W. Borneo, and the Sultan-in-Council has directed that a sum of $100 million shall be set aside in a fund to pay for the projects included in the plan. A Development Committee has been appointed to supervise the work. The more important purposes of the plan include the extension of electricity supplies and communications. The electricity supplies to Brunei Town, Kuala Belait and Tutong are to be improved and new supplies provided to Bangar and other large kampongs (settlements). A new automatic telephone exchange will be installed in Brunei Town, with a radio-telephone system connecting all the main towns and kampongs. The system will later be connected to the Sarawak network.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Self-Regulating Alternators

THE range of self-regulating a.c. generators made by HIGGS MOTORS, LTD., Witton, Birmingham, 6, is designed primarily for operation without the use of an automatic voltage regulator of any description. The hand operated regulator, once set, requires no further adjustment, thus rendering the generators simple to operate and suitable for supplying power and lighting simultaneously. The automatic excitation winding is embodied in the main generator structure and the resultant exciter action ensures a constant output voltage within $\pm 2\frac{1}{2}$ per cent on all loads of unity power factor. An additional feature is the inclusion of a series field winding which enables the machine to be used as a starting motor when the prime mover is an engine. This arrangement necessitates a battery and when running as an a.c. generator the machine simultaneously gives a 240 V d.c. output for charging purposes. The ratings at present available range from 2 to 7 kVA at 50 c/s (1,500 r.p.m.) and $2\frac{1}{2}$ to 9 kVA at 60 c/s (1,800 r.p.m.).

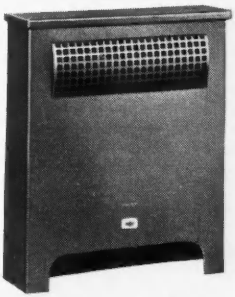


Higgs self-regulating a.c. generator

Convector Heater

A convector air heater recently placed on the market by the ARORA CO., Rosebery Street, Loughborough, provides comfort with safety and is primarily intended for domestic use. Robustly constructed in sheet steel with lagged walls, the 1 kW portable model is supplied with 4ft of three-core flex and incorporates an indicator light. The standard finish is stoved enamel bronze or silver green. The heater weighs 20 lb and measures 22in high by 18in wide by 6in deep. The price is £6 10s 0d plus £3 11s 6d purchase tax in the United Kingdom.

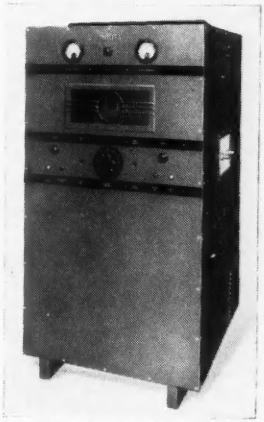
The 2 and 3 kW models are of similar design but are arranged for floor fixing and provided with a switch.



Arora convector air heater

Induction Heating Generator

The latest addition to the range of induction heating generators made by PHILIPS ELECTRICAL, LTD., Century House, Shaftesbury Avenue, London, W.C.2, has a maximum output of 6 kW (continuous). This Type F13 generator has a built-in variable coupling transformer for on load control of the output power which allows for a choice of automatic or manual operation. Tapped h.v. secondary voltages are available and a synchronous timer with a wide choice of time ranges can be supplied



Philips F13 induction heating generator

if required, at a slight additional charge. The valve complement consists of one oscillator and six rectifiers and the equipment has been designed to operate on 380/440 V three-phase 50 c/s mains.

The generator, which conforms to B.S. 1799, is supplied complete with mains breaker and interference suppressor unit, weighs about 11 cwt and is 5ft 7in high, 3ft 9in wide and 3ft deep. All circuits are fully fused and fitted with adequate safety devices.

Remote Indication System

A new system for measuring pressures, temperatures and mechanical movements electrically and indicating the results at a distance has been introduced by SALFORD ELECTRICAL INSTRUMENTS, LTD., Peel Works, Silk Street, Salford, Lancs. It is a development of the original electro-mechanical convertor system but introduces a smaller transducer with a wide range of applications. These include the direct measurement of mechanical movements of 0–20, 0–50 and 0–100 thousandths of an inch by a spring-loaded stylus, the measurement of pressures, using a diaphragm or other pressure/mechanical conversion device, and any other quantity which can be converted into a mechanical movement.

The instrument, which is similar to a standard moving coil switchboard instrument with a 100 deg scale, can be any distance from the transducer, provided the resistance of any one conductor does not exceed 25 ohms. To prevent errors due to stray a.c. pick-up, all three conductors should run within the same cable or conduit. With the standard type of three-core cable, the maximum distance between the transducer and the instrument is 1,000 yd, but greater distances are possible.

If desired, certain types of a.c. potentiometric recorders may be used in place of the instrument and it is possible to switch the output of up to ten transducers on to one instrument.

Flameproof Switch

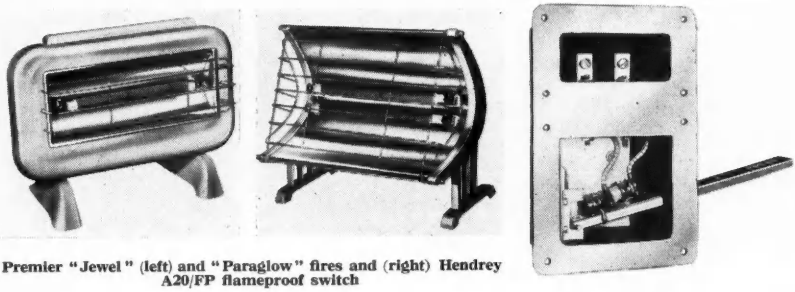
The lever operated flameproof switch which has recently been put on the market by HENDREY RELAYS, LTD., Bath Road, Slough, Bucks, is enclosed in a cast-iron case with tapped conduit entry, and two removable covers, one for external connections and the other giving access to the mercury switch. The mercury switch is made of toughened glass incorporating a fused-in porcelain liner for added durability, the beaded leads and contacts being capable of handling 20 A at 230 V a.c. or 10 A at 440 V a.c. By using mercury switches with a mercury to mercury contact, complete freedom from contact troubles is ensured; they are particularly suitable for use in a corrosive or dusty atmosphere. The switch is operated by means of a snap action pressed steel lever extending from the side of the casing, this lever being of substantial construction to withstand mechanical shock.

This A20/FP switch was originally designed for use with gas holders, starting a motor when the gas holder dropped to a certain level and cutting the motor off again when the holder had reached the desired height, but it has many other similar applications. The switch has been granted a Buxton certificate for use in inflammable gases and vapours Group 2.

Reflector Fires

Two new modern-style electric fires are announced by PREMIER ELECTRIC HEATERS, LTD., Keeley Street, Birmingham, 9. The "Jewel" is made in one size only, 1 kW loading, and the "Paraglow" is available in either 1 kW or 2 kW models. Elements are of the rod type and each fire consists of a sturdily constructed one piece steel body with highly polished trough reflector.

The fires are fitted with safety guards conforming to the regulations and well balanced feet ensure that the fire is quite stable. The "Jewel" is finished in either cream or green and is priced at £1 17s 6d plus £1 0s 8d purchase tax in the United Kingdom. Prices of the "Paraglow," in cream or bronze, are £2 5s 0d, plus £1 4s 9d purchase tax (1 kW) and £2 15s 0d plus £1 10s 3d purchase tax. Both models are guaranteed for 12 months and two yards of 3-core flex is provided.



Premier "Jewel" (left) and "Paraglow" fires and (right) Hendrey A20/FP flameproof switch

Platinum Metals Exhibition

THE importance of the platinum metals in industry was demonstrated at an exhibition organized by the Institution of Metallurgists at Grosvenor House, Park Lane, London, last week (22nd–24th October). The exhibition, which was opened by the Duke of Edinburgh, commemorates the announcement in 1803 by William Hyde Wollaston of his discovery of the metal palladium, an announcement taking the unusual form of a handbill offering the metal for sale in a Soho shop.

Palladium was the second of the group of platinum metals to be discovered, platinum itself having been known since the sixteenth century. Rhodium was also identified by Wollaston, and osmium and iridium by Tennant, his English contemporary. Ruthenium was the last to be discovered in 1840 by Claus, a Russian chemist.

More than 75 per cent of the total production of the platinum metals goes to industrial applications. Their main uses result from their high melting points and great resistance to corrosion and oxidation. Workability, which varies greatly among the six metals of the group, also determines their respective fields of use. The two most abundant, platinum and palladium, are ductile and malleable. Rhodium and iridium on the other hand can be worked only with difficulty and it is not yet possible to work ruthenium and osmium satisfactorily at all. Platinum and palladium are generally used in wrought form, ruthenium, osmium and iridium find their main uses as hardening additions to platinum and palladium, while rhodium, in addition to its use in platinum alloys, finds considerable application as an electrodeposited coating.

One section of the exhibition comprised an interesting collection of items connected with Wollaston and his discoveries and with the early history of the platinum metals. Other exhibits showed the use of different metals and alloys of the platinum group for electrical contacts. For some purposes contacts must be completely reliable in all atmospheric conditions, for many millions of operations; a platinum contact was exhibited which has completed 380 million operations and is still serviceable. Rhodium-plated silver contacts, immune from atmospheric tarnishing, are a part of fire detector switches for use in potential fire zones, and iridium-platinum alloy contacts are used in echo depth sounders.

A tungsten-platinum alloy for aircraft spark plug electrodes was developed during the last war to withstand the very severe conditions of spark erosion, high temperature, vibration and attack by lead resulting from decomposition of anti-knock compounds.

Exhibits were also shown to demonstrate the uses of the metals in the chemical industry and the jewellery trade.

Electric Steel Furnaces

RECENT developments in electric arc furnaces for the steel industry in the U.S.A. were described in a lecture, arranged by Birlec, Ltd., which was given in Sheffield recently by Mr. W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corporation. During the first world war electric furnaces, which from 1906 had been replacing crucible furnaces for making tool steels, were applied to the making of alloy steels, and in the last war 20ft diameter 12,000 kVA furnaces were installed. Their use for the production of common quality steels (dating from 1921) was established between 1939 and 1945 with large units and to-day several 125 ton furnaces rated at 36,000 kVA were in operation, with larger ones under construction. Further expansion awaited the devising of methods of working hot metal in the furnace. About 90 per cent of the steel foundries were devoted to the acid steel process in which units of up to 20 ton capacity were employed, but two 50 ton furnaces would be installed shortly to compete with basic open hearths in the production of castings. At present only 7 per cent of steel was produced electrically, compared with 5 per cent in Great Britain and with over 40 per cent in Italy and Sweden.

Progress made in electric furnace size and transformer ratings and the relationship between shell diameter and metal-holding capacity over the past twenty years were dealt with.

Production figures for several installations were quoted, which showed that for casting and alloy steel production, the electric furnace had proved superior to any fuel fired unit. A recent development was the installation of a static induction stirrer on a 90 ton, 20ft diameter, 20,000 kVA arc furnace which promised many advantages.

The electric furnace had a thermal efficiency of over 70 per cent compared with 25 per cent

for the open hearth, which was a fundamental economic factor. The lecturer suggested that, despite phosphorus and sulphur problems in Great Britain, which did not apply in the U.S.A., electric furnaces of far greater capacity might well be employed here. The 70 ton Birlec furnace now being built would have about twice the rating of any hitherto used in this country: its diameter of 19ft, however, compared with 24ft for one in Belgium, which he predicted, would be equalled or surpassed shortly in England.

Second Trinidad Power Station

Inauguration of Plant in South of Island

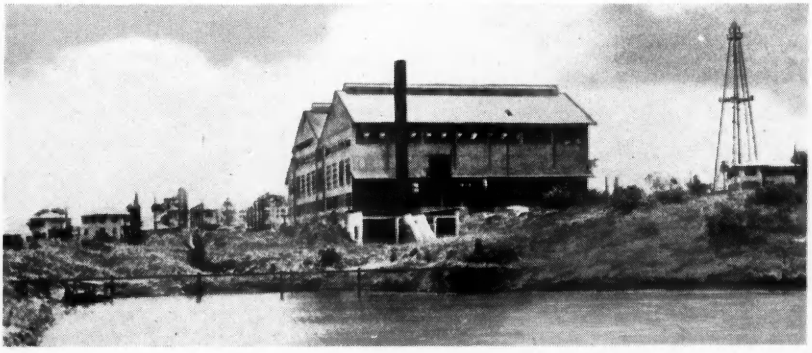
THE second (Penal) power station in Trinidad, of the Trinidad and Tobago Electricity Commission, was recently put into commission with a 5,000 kW B.T.H. turbo-alternator set served by a Babcock & Wilcox 60,000 lb/hr boiler with steam conditions of 425 lb/sq in and 740 deg F. Penal is only a few miles from the south coast of the island and near sources of natural gas and cooling water from wells.

Jungle Site

The site selected was jungle, 48 acres of which have had to be cleared. The present buildings are designed to accommodate up to a total of 30 MW. The buildings are of steel frame construction with a total floor area of 28,585 sq ft. Condenser circulating water is taken initially from four wells at the extremities of the site. By the construction of a dam 340ft long a six million gallon storage reservoir has been created, while a bank of wooden cooling towers has been erected on high ground so as to allow a natural flow of cooled water to the condensers. The boiler is normally gas fired, although there is provision also for oil firing in emergency; but the boiler can be fired to full capacity on either medium.

Generation is at 6·6 kV, although the alternator for the second 5,000 kW set is to be wound for 11·5 kV. The station will be linked to the Port of Spain station in the north by a 66 kV transmission line, and it will supply a 33 kV ring main to the south-west and a 12 kV ring main to the nearer oilfields. The following are other principal contractors: cables, British Insulated Callender's Cables, Ltd., Enfield Cables, Ltd., Aberdare Cables, Ltd., and Pyrotenax, Ltd.; main and auxiliary switchgear and control gear, A. Reyrolle & Co., Ltd.; power station building superstructure, Cargo Fleet Iron Co., Ltd.; stores and workshop building superstructure, P. & W. MacLellan, Ltd.; condensing and feed heating plant, Metropolitan-Vickers Electrical Co., Ltd.; circulating water pumps, Drysdale & Co., Ltd.; cooling towers, Davenport Engineering Co., Ltd.; house transformers, Lindley Thompson Transformer & Service Co., Ltd.; alternator transformer, C. A. Parsons & Co., Ltd.; and switchgear and transformers for 66 kV substation, English Electric Co., Ltd.

The present buildings of the Penal power station are designed for a plant capacity of 30 MW



Surrey County Hall

Lighting of the New Ashcombe Wing

NINE years after being destroyed by a flying bomb, the Ashcombe Wing of the Surrey County Hall at Kingston-on-Thames has been completely rebuilt and was officially reopened recently. From the electrical point of view the principal interest in the building, which comprises the Ashcombe Room (a large conference hall), a reception room, anteroom, two committee rooms, a jury room, and records, civil defence and district audit rooms, lies in the lighting installation.

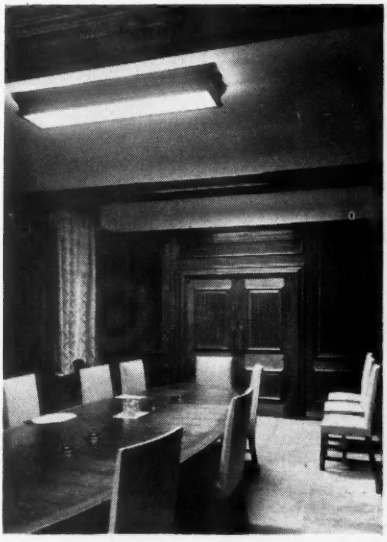
Tungsten lighting has been employed throughout the Ashcombe Room which has been decorated in pale green and white, with pleated silks hung over acoustic tiles. Twelve Holophane reflectors incorporating 300 W lamps have been built into the coffered ceiling, special slotted louvres, made by the electrical contractors, being removable for maintenance purposes. Supplementary lighting comes from five spun-metal indirect wall fittings (Merchant Adventurers) each housing two 150 W lamps.

In the adjoining reception room six "Atlas" 5ft 80 W 3,500 K fluorescent tubes are mounted in a laylight on batten fittings in such a way as to be invisible in daylight. Outlets have been concealed beneath rosettes at each corner of the laylight in anticipation of the eventual installation of pendant fittings. Amber ceiling bowls (Falk Stadelmann) are fitted in the anteroom.

The two committee rooms are both equipped with Courtney Pope twin-tube balanced lighting ceiling units incorporating "Atlas" 4ft 40 W 1,500 K tubes. The jury room, which can also be used as a committee room, has tungsten lighting from spherical fittings.

Illumination by louvred reflectors built into the ceiling is supplemented in the Ashcombe Room by indirect lighting from wall fittings

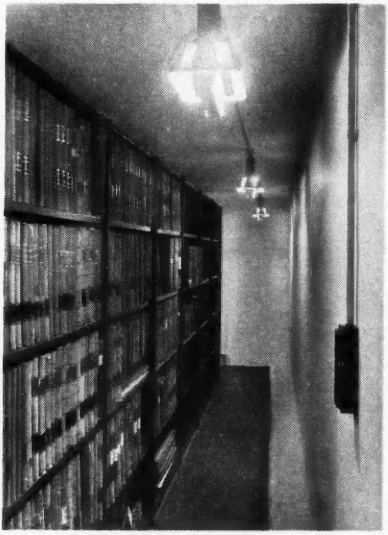
Twin-tube balanced fluorescent lighting units are used in the committee rooms



Single-light fluorescent fittings (Ekco) illuminate the district audit offices, while twin-light fluorescent units (Falk Stadelmann) are installed in the records research offices, with pendant spherical fittings in the archivist's section. Benjamin bin units are used in the underground records office, which, incidentally, is ventilated with the aid of Fenton Byrn fans and Unity thermostats.

As an additional protection against fire a special three-gang 30 A Wylex master switch mounted in a bronze plate with an Arcolectric red indicator lamp has been installed in the corridor to cover the whole of the archivist's section. Elsewhere the switches, switch-sockets, etc., in some instances of special design and finish to harmonize with the surroundings, have been supplied by the Wandsworth Electrical Mfg. Co., Ltd. Similarly the electric clocks, which are of the Synchronome impulse type operated by a master unit in the main building, have been provided with special flush faces in the Ashcombe, reception and committee rooms.

The supply to the Ashcombe Wing is controlled through a Bill switch fuse unit and main distribution board situated in the corridor in the basement and sub-boards on the floors above. The opportunity has been taken during the rebuilding to reorganize the adjacent switchroom so that the lighting and heating supplies can be separately controlled and to improve the arrangements for changing over to the emergency diesel set in the event of the failure of the public supply. In addition the boiler room has been completely rewired.



Bin lighting units are installed in the underground records office

The rebuilding was carried out by Allen Fairhead, Ltd., to plans prepared by the county architect, Mr. J. Harrison, A.R.I.B.A. The electrical contractors were Buchanan & Curwen, Ltd.

Selenium Resources

ONLY a small proportion of the selenium needed in industry is used for its property of conducting electricity in the light but not in the dark, thus making its use necessary for photo-electric cells. Its most important function is to rectify a.c. to d.c. for use in television, radio communications, electrolytic processing and electronic equipment, especially radar. It also provides a red colouring agent for the plastics industry and a means for decolorizing glass.

There are many further potential uses for the element if present supplies permitted, but expansion since the war of its varied applications has caused a shortage. No known deposits are worth mining.

Selenium occurs in sulphide ores and is mostly obtained as a by-product of electrolytic refining of copper, in the form of anode slime. The United States is the biggest producer, all from this process, but has to import supplies. Most of Great Britain's requirements come from Canada and cost less than the small quantities received from Sweden and Japan.

Investigations are being carried out by the Chemical Laboratory of the Department of Scientific and Industrial Research in connection with the flash roasting of iron sulphide or pyrites to avoid using sulphur as raw material in the manufacture of sulphuric acid. Selenium is concentrated in the residue from the process. The pyrites vary so widely in their selenium content that the economics of this method have not yet been established.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Cable Developments

TO enable higher voltages to be employed for the economic transmission of electricity, various types of cable have been produced. The main feature of design is the attempt to prevent the formation of voids, or spaces, which are subject to ionization in the paper wrapping that, with the impregnant, forms the dielectric. The methods by which present types of h.v. cable are produced and the materials which comprise them are rather costly, and with regard to future requirements may well become a manufacturing impossibility; or, if produced, their transport and laying in economic lengths may not be practicable. Above 5in diameter, the pipe line type of cable will become a necessity and in consequence new methods of manufacture will be required. A cable construction of the following description would probably meet most of the problems associated with supervoltage cables:

(1) An outer sheath of aluminium of up to 4½in diameter and steel tube of 4½in diameter upward; (2) a core of three hard drawn stranded conductors, with an extra core if required; (3) longitudinal insulation tubes to afford equidistant conductor spacing; (4) circumferential insulation to space the conductors symmetrically within the sheath.

Items (2), (3) and (4) would form a skeleton flexible core when made up similarly to a string of beads of long length and drawn into the sheath, if of aluminium. When a steel sheath was used the core would be wound on a cable drum and protected with a waterproof covering sheet for transport to the site of a laid conduit with its associated joint and stop joints ready for the insertion of the cable core.

The circumferential spacers would be perforated to allow free flow of the dielectric through the length of the cable. Tracking on the core-supporting structure would be obviated by the use of " Sillimanite " which is an effective insulator under all conditions of temperature likely to arise through overload conditions.

There would be four types of accessories: (1) through joint; (2) stop joint; (3) intersection joint; and (4) cable to overhead terminal, all of simple design. Items (2) and (3) would have relief valves and indicating pressure gauges with by-pass connecting pipes. Item (4) would also have a pressure gauge and a tube for the filling of the dielectric and for connection with the reserve supply container and pressure applicator.

This kind of construction implies a system in which the conductors are suspended in a dielectric of oil or gas throughout their length. Leakage of the dielectric is the only fault which could arise and should be made up from the reserve container and pressure applicator.

As each section of cable could be dielectrically isolated by the stop valves, a leaky section could be detected by the pressure gauge on each side of each stop joint. Insulant could be fed in at any point or renewed after long periods of service without replacement of the cable. Thus the life of the latter would depend on the durability of the sheath. Entry into terminating gear could be accomplished by bolting part of the stop joint casing to the oil filled busbar chamber of switchgear or transformer.

Uttoxeter, Staffs. W. KNIGHT.

Waste of Energy

WITH reference to the letter by Mr. James McCash in your issue of 2nd October, concerning the services which could be rendered by factory inspectors and the inspectors employed by boiler insurance companies in the campaign for the more efficient use of fuel: I was with an engineering insurance company for some years up to 1948 as an electrical inspecting engineer covering a district in south-east Lancashire and recollect that early in the war all the inspecting engineers—electrical and

mechanical — received a copy of the Ministry of Fuel and Power's suggestions for the efficient utilization of fuel, and were asked to mention this matter when in conversation with their clients. From my contacts with firms in Lancashire I formed the opinion that some very useful work was done in drawing the attention of cotton mill engineers and others to such matters as insufficient lagging on boilers and pipework; the advantages of reliable CO_2 recorders; inefficient steam traps; low power factor; and, last but not least, boiler firing.

Possibly most of the larger firms in the country are now well aware of the saving to be made by minimizing heat losses and employ professional staff to deal with the subject, but it may well be that there are many small or medium sized firms who could benefit by advice and guidance and would be glad if such deficiencies in their plant were brought to their attention. If arrangements could be made for the " other observations " sections on the statutory forms for boiler and steam receiver examinations to include appropriate recommendations on fuel economy, a worthwhile saving would doubtless result both to individual firms and to the country as a whole.

S. WOODHOUSE, A.M.I.E.E.,
Abingdon, Berks. ASSOC.I.MECH.E.

Lamps for Street Lighting

AS one who has boldly, and to some rashly, nailed my colours to the sodium mast, I was naturally interested in Mr. Robinson's counterblast urging the universal use of fluorescent lamps for Class A street lighting. I am, however, more than a little dubious of his comparative figures. In the first case, I think that it will be found that the capital costs of the two types of lighting are somewhat as follows:—

	Fluorescent			Sodium		
	£	s	d	£	s	d
Lantern	35	0	0	11	15	0
Column	23	0	0	18	10	0
Ballast (inc. cond.)		—		5	10	0
Service	6	10	0	6	10	0
Erection (inc. transport)	8	0	0	5	10	0
Management ..	3	10	0	3	0	0
	76	0	0	50	15	0
Amortization (8 per cent)	6	1	6	4	1	0

This gives a difference in the annual capital costs of £2 instead of the £1 19s in Mr. Robinson's calculation. In both cases a lantern of first class quality has been estimated—an enclosed one in the case of the sodium.

In addition there is the question of maintenance. Mr. Robinson has simplified matters by assuming that labour costs are the same for both types of lanterns. Unfortunately, this is not so, and I should say that a fluorescent lantern costs from 10s to 15s a year more than its sodium rival. I am in agreement with the remainder of Mr. Robinson's calculations. It is seen, therefore, that my contention is that capital charges should be 8s, and maintenance cost 10s–15s greater than shown, say £1 as a round figure. The effect of this is that instead of sodium costing 10s per annum more, it does in fact amount to 9s less than fluorescent.

My attention may be drawn to the considerable saving occasioned by leaving only one lamp alight after midnight, but here again there is debatable matter. Relatively few lamps are individually time-switched (when the provision of an additional switching off time by means of a second trip arm would be a trifling matter) and the provision of a second switch conductor would be needed. On existing networks where only one switch conductor is provided, an alternative would be the installation of separate time switches, which would be a retrograde step, apart from the extra capital cost.

Continuing to review the subject from the economic aspect, I cannot agree that from the viewpoint of the driver, the colour rendering of the fluorescent lamp is superior to the monochrome of the sodium, so far as visibility is concerned. If anything, the reverse is true, as witness the use of yellow headlamps on the Continent. This being so sight must not be lost of the fact that the sodium lamp affords 9,000 lumens against the 7,200 lumens of the two 80 W fluorescent tubes with which it is being compared.

It will be seen therefore that my faith in sodium for the lighting of trunk roads remains unshaken. I have already expressed my opinion of the suitability of fluorescent lighting for amenity areas, such as town centres, and here I am in full accord with Mr. Robinson. I think that horizontal lanterns when mounted on

columns are unduly obtrusive from the daylight aspect and that future development will be in the use of vertical units, possibly with refractor systems to overcome the present wastage in the upper hemisphere, and wall mounted lanterns. It also occurs to me that the present size of lanterns may be cut down at some time by the use of " U " shaped tubes, which would have an overall length of just over 2ft.

I think Mr. Robinson has put up a very good case for the fluorescent lamp, and it needs but little to make the scales of economy dip in his favour; for the present, however, the balance is in favour of sodium. Finally, it is noteworthy that both Mr. Robinson and myself have relegated the h.p.m.v. lamp to a ringside seat.

F. H. PULVERMACHER.

Pentyrch, Glam.

FOR a considerable period the discussion on this subject in your correspondence columns almost gave promise of arriving at some denouement which would be of some practical value. As time passed, however, it became obvious that, like our street lighting itself, it was to be barren of any contribution of an imaginative or creative nature.

The uninspired discussions amongst those various councils and committees who have been appointed with a view to reducing deaths on the roads, would indicate that none of their personnel had ever driven a motor car at night. The first essential to safeguard pedestrians at night is that the driver of a motor vehicle should be provided with the most efficient lighting possible from *his* viewpoint. Indeed it could be called the point from which all design should proceed.

Yet what do we find? Every modern scheme takes the form of unshaded lights placed sufficiently high to reduce all contrasts of light and shade to a flat monotone. Even the colour of the light seems to be cunningly arranged to distort the colour of people and objects to an extent which finally wipes out the remaining possibility of any contrast.

Two of the elementary essentials in any scheme are, first, that all street lights shall be so arranged that the light source itself shall be completely invisible to the driver of a motor vehicle. It surely is common knowledge that the eye, having accommodated itself to the glaring intensity of a naked high power light source, is incapable of resolving objects under low illumination on the road. Secondly, that no street lighting scheme should be entered upon without the co-operation of a highly qualified eye specialist, preferably one who has experience of driving through the nightmare illumination of our streets from behind a wet windscreen.

It surely is time that the problem of street lighting should be examined by people whose minds can emerge from the groove of lumens and consumption in watts. If the situation is carefully analysed, the question at once arises why it has become customary to expect the electrical engineer to evolve a lighting scheme at all when the whole subject is one of optics. One would hardly expect a coal miner to design a high pressure boiler, because he is engaged in producing the fuel. Lighting science is quite outside the experience of the average engineer.

Banff, Scotland. JOHN D. RAVENSCROFT.

Belfast Contracts

THE legal department of Belfast Corporation has under consideration letters from two firms of contractors concerning tenders for plant for the new Victoria power station. It is understood that the letters draw attention to the fact that the Corporation had accepted—and confirmed acceptance—of tenders for work which was subsequently put out to public advertisement. The decision by the Corporation to advertise for tenders followed the judgment in the Ulster High Court on the acceptance of the £2,976,469 tender of Babcock & Wilcox, Ltd., for the supply of the plant.

One of the letters is believed to be from Babcock & Wilcox. Their tender was accepted by the Corporation on the recommendation of the Electricity Committee, but the contract had not been signed. The completion of the legal documents which bind the Corporation takes a considerable time. In the circumstances, when firms tender and their tenders are accepted they invariably prepare plans and in some cases actually start work before the legal formalities are completed and this has come to be recognized as normal municipal practice. The letters are believed to point to this practice and the question of compensation for work done may now arise.

The letters will go before the Electricity Committee in due course together with counsel's advice.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT the annual general meeting of the British Institution of Radio Engineers, held in London on 21st October, a certificate of honorary membership was presented to **Sir Noel Ashbridge.** The citation of the award referred to Sir Noel's outstanding work as director of technical services of the British Broadcasting Corporation and paid tribute to his notable contributions to the whole field of radio engineering. In expressing his appreciation of the honour of becoming more closely associated with the Institution, Sir Noel praised its expanding work in all spheres of its activities and said that its comparative youthfulness of twenty-eight years was in keeping with the radio industry.

Mr. H. C. Pritchard, B.A., F.R.Ae.S., has been appointed deputy general manager of Elliott Brothers (London), Ltd., in charge of science. Until recently Mr. Pritchard was chief superintendent of the Long Range Weapons Establishment in Australia, and before that was head of the Instrument and Air Photography Department of the Royal Aircraft Establishment.

Mr. Mervyn W. Shorter, whose appointment as managing director of the Westinghouse Brake & Signal Co., Ltd., was reported in last week's issue, joined the McKenzie Holland & Westinghouse Power Signal Co., Ltd., in 1915. After a year or two he entered the Outside Signal Contracts Department and worked on various signalling contracts in the British Isles, including the Liverpool Overhead signalling in 1920. He then went to Argentina as assistant to the constructional engineer engaged on the complete power signalling of the Buenos Aires Great Southern Railway, and was afterwards in charge of the signalling installed on the Buenos Aires Underground Railway. He returned to England in 1932, but spent more than half of the next seven years abroad, representing Westinghouse in, among other countries, Argentina, Brazil, Canada, Chile, China, Egypt, India, Japan, Spain, Rhodesia and South Africa.

Mr. M. W. Shorter

Mr. Shorter was appointed assistant sales manager at the end of 1940, deputy sales manager in 1946, and sales manager in 1948. He was made a director of the Railway Signal Co., Ltd., in 1948, and of W. R. Sykes Interlocking Signal Co., Ltd., in 1951, later becoming chairman of both these companies. He joined the board of the Westinghouse Brake & Signal Co. in 1950.

C. A. Parsons & Co., Ltd., announce the appointment to the board of **Mr. E. N. Robinson,** LL.B.(Lond.), deputy chairman of A. Reyrolle & Co., Ltd., director of a number of other companies, and senior partner in the firm of Watson, Burton, Booth & Robinson, solicitors.

Sir Robert Renwick, Bt., K.B.E., has joined the board of Reliance-Clifton Cables & Industrial Products, Ltd., and has been elected chairman, a post which has been temporarily occupied since the death of Mr. Arthur Collins by Mr. H. Davis, co-managing director of the operating company, the Reliance Electrical Wire Co., Ltd.

Barlow-Whitney, Ltd., announce the appointment of **Mr. H. Melrose,** A.M.I.E.E., of the Technical Department, as district engineer and manager, Midlands Area, following the retirement of **Mr. J. Hearn Noble.** Mr. Melrose will operate from the office at 6-8, Holloway Head, Birmingham, 1 (telephone: Midland 6897).

Mr. S. J. Hewlett, A.M.I.E.E., has joined the meter design staff of Smith Meters, Ltd., as assistant to Mr. H. E. Angold. Mr. Hewlett was previously with Measurement, Ltd., and was in charge of meter and instrument development. He specialized in that company's ripple control equipment.

Mr. W. W. Scott has been appointed secretary to Smith Meters, Ltd. He was previously chief accountant and has been with the company since 1941.

Mr. G. E. Richards, A.M.I.Mech.E., A.M.I.A.E., has been appointed assistant manager of the Prestcold Refrigeration Division of the Pressed Steel Co., Oxford, with effect from 1st October. Mr. Richards has been for some years sales promotion and publicity manager of the Refrigeration

Division and before that was associated with other activities of the Pressed Steel Co. In addition to his new managerial duties Mr. Richards will continue to control the operation of the Sales Promotion and Publicity Department.

Sir Alexander Roger formally opening the new B.I.C.C. factory at Leigh, Lancs

Elsewhere in this issue we refer to the new factory at Leigh, Lancs, of **British Insulated Callender's Cables, Ltd.** In the accompanying picture we show Sir Alexander Roger (chairman) formally opening the factory by pressing a button which operates the main doors. With him are (left to right) Mr. T. L. Osborne (Leigh works manager), Lt.-Gen. Sir Ronald Scobie (director), the Mayor of Leigh, and Mr. H. J. Stone (director and deputy chief executive, B.I.C.C.).

Last week we reported the appointment of **Mr. W. L. Brown** as chief engineer to Transformers (Watford), Ltd. We should have made it clear that Mr. Brown relinquished the position of chief assistant designer to Mr. E. T. Norris (which he had held for twenty years) in 1944 to take up an appointment as sales engineer, subsequently returning to work under Mr. Norris to devote his attention to medium power transformer design.

Mr. G. Millington, M.A.(Cantab.), B.Sc., chief of the propagation section of Marconi's Wireless Telegraph Co., Ltd., has been appointed vice-chairman of the Study Group No. IV of the International Radio Consultative Committee (C.C.I.R.).

Cable & Wireless, Ltd., announces that **Mr. Alexander Findlay,** assistant superintendent marine engineer, will succeed **Mr. John Armstrong,** superintendent marine engineer, who is to retire to-morrow (Saturday) after thirty-one years' service with the company. **Mr. Lessels Roy,** who joined the company in 1937, becomes assistant superintendent marine engineer.

Mr. H. W. Griffiths, A.M.I.E.E., M.S.M.A., export sales manager of Evershed & Vignoles, Ltd., will leave London Airport to-morrow (Saturday) for visits to Pakistan, India, Ceylon and Burma.

Mr. T. H. Greaves, manager of the General Electric Co.'s Nottingham Branch, has been elected president of the Nottingham Society of Engineers.

The dinner-dance of the **I.E.E. Scottish Centre** will be held on 17th November at Grosvenor Restaurant, Gordon Street, Glasgow. Applications for tickets (30s each) should be made by 9th November to Mr. J. H. P. de Villiers, hon. secretary, Bruce Peebles & Co., Ltd., 19, Waterloo Street, Glasgow, C.2.

OBITUARY

Lt.-Col. W. A. Vignoles.—We regret to report the death, on 24th October at East Horsley, of Lt.-Col. Walter Adolph Vignoles, D.S.O., M.I.E.E., for many years a well-known personality in the industry. Col. Vignoles was born in London in 1874 and was educated in France and the Finsbury Technical College. After undergoing training with W. T. Goolden & Co. he was for a time in charge of electric coal-cutting plant in Durham mines, with an associated company. In 1895 he joined Crompton & Co. at Chelmsford, becoming chief draughtsman. He left Cromptons in 1899 to become assistant to Sir Alexander B. W. Kennedy and was given the task of supervising the construction of the Grimsby electricity undertaking. Upon the completion of this work in 1901 he was appointed Grimsby's borough electrical engineer and held that position until 1928.

The late Lt.-Col. W. A. Vignoles

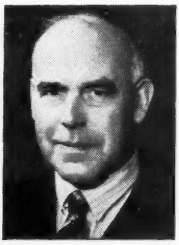
During the 1914-18 war he served with the 10th Battalion, Lincolnshire Regiment, and the 9th Battalion, Northumberland Fusiliers. He attained the rank of lt.-col., was wounded on the Somme, and was awarded the D.S.O., and bar.

Col. Vignoles left Grimsby in 1928 to become director of the British Electrical Development Association, in succession to the late Mr. J. W.

Beauchamp, but three years later resigned to take up the post of joint managing director of Evershed & Vignoles, Ltd. In 1941 ill-health forced him to give up that position but he remained on the company's board.

For some years Col. Vignoles was active in the affairs of the former Incorporated Municipal Electrical Association and was president in 1922-23. He had also served on the I.E.E. and B.E.A.M.A. Councils.

Mr. W. A. Jackson.—The death occurred on 25th October of Mr. William Alfred Jackson, O.B.E., M.I.E.E., M.I.Mech.E., director of the Telephone Manufacturing Co., Ltd., and associated companies. Mr. Jackson was born at Areley Kings, Worcestershire, in 1885 and was educated at the Bewdley Grammar School and the Birmingham Central Technical College. After a period of training with Belliss & Morcom, Ltd., he was in that company's drawing office from 1906 to 1910 and was then assistant works manager for six years. He joined the Telephone Manufacturing Co. in 1916 as works manager and in 1928 became sales manager, a position which he held until 1939 when he was appointed to the board of the company.



The late Mr. W. A. Jackson

Mr. Jackson had been chairman of the governors of the L.C.C. Norwood Technical College since 1920 and he was chairman of the Ministry of Labour Juvenile Advisory Committee, Brixton, from 1945 to 1950. He was a past-chairman of the Radio and Electronics Component Manufacturers' Association. He was made an O.B.E. in the 1952 Birthday Honours. The funeral took place at Bromley yesterday (Thursday).

Mr. E. F. Behenna, district commercial engineer, Sevenoaks and Horley, South Eastern Electricity Board, died in Redhill County Hospital last Friday at the age of fifty-seven. Mr. Behenna spent his early days with the Marylebone Borough Council Electricity Department, and in the 1914-18 war he served with the Royal Engineers. In 1930 he joined the County of London Electric Supply Co., Ltd., as a representative, and before his last appointment was development officer for the Croydon rural district of the County Company.

Mr. Alexander Fraser, A.M.I.E.E., until his retirement in 1926 a partner in the firm of Fraser & Borthwick, Glasgow, died on 21st October at a nursing home at Bexhill-on-Sea.

WILLS

Mr. F. A. Roberts, for over twenty-five years chief electrician at Skefko Ball Bearing Co., Ltd., who died on 16th June, left £3,082 gross (£2,769 net).

Mr. H. S. Clarke, A.M.I.Mech.E., manufacturing engineer, English Electric Co., Ltd., Rugby, who died on 28th August last, intestate, left £3,079 gross (£3,003 net).

Mr. R. M. W. Kullman, M.B.E., area sales manager of Measurement, Ltd. (Electricity Division), who died on 2nd July last, intestate, left £5,924 gross (£5,730 net).

Mr. W. Yates, chairman and governing director of Matthews & Yates, Ltd., who died on 11th July last, left £62,495 gross (£62,383 net).

Mr. C. E. F. Plutte, a director of Enfield Cables, Ltd., and managing director of Enfield Rolling Mills, Ltd., who died on 8th July, left £16,705 gross (net value nil).

Diesel-Electric Standards

THE increasing value of the world's free market for diesel-electric "power packs" (complete miniature generating stations) and the share obtainable by British manufacturers were assessed in a paper by Messrs. J. C., J. W. and W. I. Macfarlane, presented on 20th October before the Institution of Engineers and Shipbuilders in Scotland. Growth of demand would be greatly accelerated, the authors believed, through standardization of components, especially electrical. Detailed suggestions were made to this end. About 400,000 kVA of generators of from 5 to 500 kVA were made each year in this country, half of which were exported. The United States exported 240,000 kVA and the world total free market amounted to 800,000 kVA which at £8/kVA for alternators yielded £6·4 million.

The price per kVA for a power pack running at 1,000 r.p.m., with the simplest switchgear, would be £34, making the value of the free demand about £27 million. Only high-speed engines of the compression-ignition, solid-injection, four-stroke type driving revolving-field alternators needed to be considered. Weights and dimensions of twenty-two engines by several British manufacturers were tabulated.

Jackson Cooker Dimensions

In giving details of the Jackson Electric Stove Co.'s "Two Ninety" cooker last week some incorrect dimensions were given. The overall size is 36in high by 17⅞in deep and 22 3/16in wide. The oven measures 12⅝in high by 13⅜in deep by 12 7/16in wide.

PARLIAMENTARY NEWS

By Our Special Reporter

DURING the House of Commons debate on the report of the British Transport Commission, Mr. Callaghan said he was surprised at the lack of initiative shown by British Railways in going much further into the advantages and disadvantages of diesel-electric locomotives. Apparently there was a prejudice among certain officials who were brought up in steam and still believed it was the best thing. It was essential that a larger number of diesel-electric locomotives should be obtained or built, and that British Railways should have at least a minimum of 20 or 30 of them, so that they could have proper servicing, could be run as a proper unit, and so that a real test of them could be made.

Mr. Lennox-Boyd, the Minister of Transport, said that with the steady increase in the amount of work being done on the Manchester–Sheffield–Wath electrification scheme, that would be the first example of a completely electrified main line in service in this country carrying heavy freight. They hoped that part 2 would be finished by next June and part 3 by October.

He shared the conviction that there was a great future for diesel development, and that every possible encouragement should be given to the Commission to get on with it faster. In regard to main line diesels, the Commission told him that it was difficult at the moment to arrive at any final conclusion. There were only a limited number—four, it had been said—each costing £78,000, in comparison with the "Britannias" which cost £23,000. The diesel train could make two round trips between Exeter and Waterloo in 24 hours, a performance never before attempted with steam, but there were problems with regard to maintenance. The Commission also told him that it had had two prototype gas turbine locomotives under test in the last two years and was prepared to contribute one-third of the cost of an experimental coal-burning gas turbine locomotive, and it was partly switching over to diesel shunting locomotives. The Commission had actually given orders for £11 million worth of diesel shunting locomotives. He shared the interest in rail cars and multiple-unit lightweight diesel trains, but there the Commission had come up against a number of difficulties which it had not found in the multiple-unit diesel trains. Nevertheless it was prepared to go ahead with certain schemes.

Promotional Advertising

Mr. Nabarro asked the Minister of Fuel and Power whether he would state the nature of his instructions to the British Electricity Authority and the Gas Council in regard to promotional advertising; and whether he had now removed all restrictions and inhibitions formerly imposed.

Mr. Geoffrey Lloyd said he had fully discussed with the gas and electricity industries the lines on which their advertising and publicity should be conducted. He was now satisfied that it was best for the Boards themselves to have full responsibility in this matter, and he believed that they would exercise this discretion in line with the national interest. The former restrictions had accordingly ceased to apply.

Hire-Purchased Washing Machines

Mr. Vaughan-Morgan asked the President of the Board of Trade whether, in view of the action taken to free water heaters from hire-purchase control, in order to improve fuel economy, he would now consider excluding electric washing machines from the Hire-Purchase and Credit Sale Agreements (Control) Order, 1952.

Mr. Peter Thorneycroft said he regretted that he could not make this further exclusion.

Mr. Vaughan-Morgan asked if the President would look into the matter personally, because it did not seem quite consistent with the promise of the Government.

Mr. Thorneycroft replied that the decision on water heaters took into account the recommendations of the Ridley Committee on fuel saving, which did not apply in the other case.

Housing Scheme Facilities

Mr. Janner asked the Minister of Housing and Local Government whether he was aware that houses on some new housing estates were not provided with cooking or clothes-washing facilities and that these had to be provided by the tenant; and if he would arrange that these facilities should be provided by councils in all their new houses.

Mr. Macmillan said that some local authorities preferred to give their tenants freedom of choice. Points for either gas or electricity were always installed. A tenant could then get whatever type of appliance he preferred. He did not think this was a matter on which he should dictate to local authorities.

Fuel and Power Debate

Mr. Geoffrey Lloyd, the Minister of Fuel and Power, in moving that the House should "take note" of the last annual reports and accounts of the national fuel and power industries, said that coal stocks were rising by between 300,000 to 350,000 tons a week, and there was a very good prospect of arriving at a figure of 19 million tons by the beginning of the "coal

winter." But margins were too narrow and anxiety would not be removed until much more progress had been made with the fundamental reorganization and re-equipment of the mining industry. There were two important objectives to be secured in the organization of the coal industry. First, that the colliery managers should have the maximum of responsibility in day-to-day management of the pit, and, second, that the area was the proper unit of higher management. Sir Hubert Houldsworth had informed him that the Board had issued instructions making it clear that the area was regarded as the vital unit of higher management, and that the area general manager, therefore, was in effective charge of the area, subject to necessary co-ordination and full accountability to the divisional board. Sir Hubert Houldsworth had also informed him that the Board intended to carry out an examination of its whole organization.

Each year 100 million tons of coal was consumed by the public utilities, who converted the coal into other forms of fuel and power. The electricity industry for many years had shown a remarkable and praiseworthy ability to make effective use of the kind of coals that other people did not want. Every year the B.E.A. was improving the thermal efficiency of the generation of electricity primarily by means of new power stations. In the last two years a large number of power stations had come into operation and this year the margin between generating capacity and the maximum demands in the winter was a happier one than in any previous year. In doing this the saving was about one million tons of coal a year.

Nuclear Activities

From the new nuclear establishment at Calder Hall, Cumberland, and the new breeder reactor, useful quantities of electricity should be obtained. He had been advised that we should get about 50,000 kW as a result of these nuclear activities, and data and information would be provided on which future atomic generating stations would be based. It was too early to say what real contribution would be got from atomic power stations, or when they would begin to make a significant contribution, but there was no reason why before long they should not make a useful addition to our power resources, and, therefore, to reducing the amount of additional coal that would be required.

Mr. Palmer inquired if there was any prospect of the B.E.A. having complete control of atomic power stations. Mr. Lloyd replied that it was too early to comment, but the B.E.A. was in close touch with the work going on in these stations.

Speaking of fuel efficiency, Mr. Lloyd said that the Government was trying to tackle the problem by three main methods. The first was the loans scheme to industrialists for fuel saving equipment. This year the Chancellor of the Exchequer had improved the terms of the loan. Secondly, following the recommendations of the Ridley Committee, they had arranged for a non-profit-making company to take up the work of fuel efficiency.* It was essential to get maximum co-operation from trade associations and industrialists. The British Productivity Council had agreed to sponsor the company that had been formed, with a strong board, and the Council was announcing the names that day. Thirdly, there had never been a really systematic investigation into the generation and usage of steam by industry. With the co-operation of industrialists the Ministry had been carrying out such a survey and for the first time there would be available systematic knowledge of the potentialities of power generation by back pressure methods with high efficiency in industry. One of the first points that had come out of the survey was that of the industrial boilers in use at present, one-fifth were over 40 years old, and if it were possible to substitute modern equipment there would be a saving of two million tons a year.

The Government had introduced many of the higher standards recommended by the Ridley Committee for improved grates and many of these were now coming into production.

Mr. Robens, speaking for the Opposition, said that during the five years of nationalization the electricity supply industry had shown a total surplus of £28 million, or a little less than £6 million a year. That represented about 2 per cent on the turnover. But what was the Minister planning for capital investment on the construction programme? From the figures announced it would seem that present construction would reach the stage where load spreading and shedding would be required. Although the allocations of capital investment might be subject to review year by year, the B.E.A. must know what its programme would be.

In the debate which followed, Mr. Nabarro feared that if there was a severe winter there would be a heavy demand, with the possible stoppage of industrial power in the Midlands. This would be brought about by the fact that housewives were still being encouraged to put in domestic water heaters, cookers and electric fires and not told to switch them off at peak hours. Speaking of the competition between gas and electricity, he said that there should be a national overall fuel and power policy to conserve coal.

Mr. Palmer urged that the B.E.A. should be given the opportunity of having some experimental atomic power stations of its own, thereby

* British Productivity Council announced on Monday evening the names of the directors of the new company—the National Industrial Fuel Efficiency Service. The chairman is Sir Leslie Hollinghurst and among the other members of the board are Sir John Hacking, deputy chairman (operations), British Electricity Authority, and Mr. H. F. H. Jones, deputy chairman of the Gas Council.

getting in at the beginning to gain experience in the use of atomic energy.

Mr. Joynson-Hicks, Parliamentary Secretary, Ministry of Fuel and Power, said that in five years the number of customers supplied with electricity had been increased by over two million, but we were still a long way behind America in the amount of electricity used, and it was essential if we were to keep pace with the American productivity that that gap should be closed. One of the problems was the cost of supply, and the first essential was to reduce the capital cost which the industry had to bear.

The recent pamphlet published by the British Electricity Authority† was not composed on the lines of the arrangement the Minister had made with the nationalized gas and electricity industries on the subject of advertising and publicity, and he was accordingly making inquiries into the matter. They had not done away entirely with the request for load spreading this year, and the Minister was still asking domestic and small commercial consumers to do no less than industrial consumers by being as careful as possible in their demands for electricity at peak hours.

The motion was agreed to.

Fuel Efficiency Staff

Mr. Palmer asked the Minister of Fuel and Power if he would state the number and grades of technical staff employed in his Department's fuel advisory service now proposed to be transferred to the new Fuel Efficiency Advisory Company.

Mr. Joynson-Hicks said that there were 150 technical staff at present employed in the Ministry's Fuel Efficiency Advisory Service. Of these 94 were in the professional fuel engineering grades and the remainder were employed in a lower technical capacity. It would be for the Fuel Efficiency Advisory Company to select its own staff, but all facilities would be given to the existing staff to apply for such appointments.

† We are informed that the pamphlet referred to by Mr. Joynson-Hicks is not a B.E.A. but an E.D.A. publication. It is a booklet of notes for electrical speakers entitled "Facts about Fuel," and is obtainable from the Association at 2, Savoy Hill, London, W.C.2.

Lighting Economies

MR. W. GILCHRIST, chief commercial officer of the Merseyside and North Wales Electricity Board, spoke on the economics of lighting in his address, as chairman, at the opening meeting of the 1953–54 session of the Liverpool Centre of the Illuminating Engineering Society on 20th October. He said that it might take this country many years to reach the position where we would have sufficient power from nuclear sources to cover the growing demand for electricity, but the long-term possibility of the elimination of solid fuel, gas and smoke from new towns should be borne in mind now. This long-term policy was already in operation so far as street lighting was concerned, as electricity was used for the lighting of all roads on new estates and was therefore not creating a later problem of conversion.

The lighting flat rate had gone—he hoped for ever—and tariffs were now more closely related to costs of supply. It was fair to say that the total cost of lighting in the home, in commerce and industry, represented a very small fraction of the value which resulted from good lighting. The electric lamp was probably the only manufactured article which cost the same to-day, to the general public, as it did before the last war. In common with most services, wiring installation costs had risen considerably, but careful design coupled with suitable single metered tariffs could effect economies in wiring layout for modern lighting installations. Easier access to controls and fittings, simpler shades, more efficient reflectors and longer average life of lamps in general use had made possible economies in maintenance, operation, replacement and cleaning.

So far as the price of electricity was concerned, lighting flat rates up to 1s per kWh were in operation in the area before nationalization and 6d was not uncommon; to-day the highest price for commercial lighting was 4½d, reducing to 2d and 1d.

In the earlier part of his address Mr. Gilchrist commented on the improvement in lamp output and efficiency, the increase in lamp life at greater luminosity and methods of manufacture in quality control and quantity production that had few rivals in any field of British industry.

Prices of Materials

IN the accompanying table we give the basis prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £150 0s 0d
COPPER, H.C. Electro	ton £237 10s 0d
Fire Refined 99·70 per cent ..	ton £236 0s 0d
Fire Refined 99·50 per cent ..	ton £235 0s 0d
COPPER Tubes	lb 2s 4d
Sheet	ton £296 10s 0d
H.C. wire and strip	ton £269 15s 0d
LEAD, English	ton £95 5s 0d
Foreign	ton £94 0s 0d
MERCURY	flask £61 15s 0d
TIN	ton £622 10s 0d
ZINC, G.O.B. Foreign	ton £74 0s 0d
Electrolytic	ton £75 10s 0d
BRASS Tubes	lb 1s 10¾d
Sheet	ton £238 15s 0d
Wire	lb 2s 5¾d
PHOSPHOR BRONZE	
Wire	lb 3s 8¾d
RUBBER, No. 1 R.S.S. spot ..	lb 16¾–16¼d

VIEWS on the NEWS

By REFLECTOR

ADVOCATES of electric street traction have been justified by the position arising from the strike of tanker drivers. London transport conditions would have been greatly eased if the trams had still been in operation. Of course, the other side might argue that a coal stoppage or a strike of power station men would have held up the trams but, after all, the existence of the two systems did provide a safeguard when trouble arose in one or the other. Regret at the passing of the trams, for another reason, was voiced at a conference arranged by the Bristol and District Smoke Abatement Council last week. The city's medical officer of health deplored the added pollution of the air which resulted from the substitution of motor buses for trams and remarked in this connection that "not all change is progress."

* * *

In the past I have expressed surprise at the pot-and-kettle attitude of hoteliers towards the Electricity Boards when power charges are raised. Now Mr. J. W. Simpson, secretary of the British Electrical Power Convention, writing to *The Times*, complains of the excessive charges by certain hotels to conference delegates, a policy which he says is killing the goose that lays the golden eggs. He suggests that if the hoteliers in certain towns do not "co-operate" conference organizers will be forced to go elsewhere. It would be in the hotels' own interest, he says, to offer a special conference charge for a definite stay of, say, six nights; for shorter periods the normal hotel charges should not be exceeded.

* * *

As was to be expected, Mr. Simpson's letter was followed by rejoinders from hoteliers. The first, Mr. E. D. Croft, director of the British Hotels Association, in refuting the accusation that hotels ask too much from delegates to conferences, naturally employed the *tu quoque* argument, saying that one "not unimportant factor" in increased hotel costs was the substantial increase in electricity charges. The other response was from the manager of the Grand Hotel, Eastbourne (headquarters of the 1954 British Electrical Power Convention) who says that in no case are the quoted charges higher than the hotel's tariff rates and, with the exception of the best rooms, are actually 5 per cent below these rates.

* * *

I notice in a *Manchester Guardian* article on the use of power in textile mills, by "A Consulting Engineer," the statement that

> "large sums are being spent on power factor correction from which the mills will not receive any direct benefit but which will greatly improve the generation and distribution networks of the Electricity Board."

If this were true it would be very injurious to Lancashire men's reputation for hard-headedness.

* * *

Since I wrote the foregoing, Mr. A. O. Johnson, chief commercial officer of the North Western Electricity Board, has taken up this point in a letter to the *Manchester Guardian* explaining how the consumer benefits from the installation of p.f. correction plant. He also combats a statement that the high cost of electricity is delaying the electrification of textile mills. As to short-time working, which raises the average cost per unit, Mr. Johnson points out that the difference is not a material item in production costs and moreover the Board has afforded protection to mills that have to go on short time by its institution of "ceiling" prices.

World Mineral Resources

Relationship Between Developed and Underdeveloped Countries

RESPONSIBILITIES of the engineer in a technological age with its effects on underdeveloped countries formed the principal theme of Mr. B. L. Metcalf in his chairman's address to the Utilization Section of the Institution of Electrical Engineers on 22nd October. This age, he said, stemmed from discoveries by Newcomen, Watt and Faraday of means to generate and distribute power.

Technological progress could not be arrested until the exhaustion of the world's mineral resources. Its pace had been accelerated by two world wars and the growth of nationalism in Asia and Africa had stimulated a desire there to share its fruits and to improve standards of living. Highly developed countries were devising schemes of technical aid to those less advanced.

To interpret technological progress simply from the technical or material point of view was to ignore the human problem—one of its essential aspects. It was wrong to assume the existence of a technical solution to every problem; technology was incapable of solving the problems it created. Improvements in tools altered man's whole view of life.

World population, now about 2,400 million, was expected to reach 3,000 million by A.D. 2000. American population, with its high rate of infant survival, was growing more quickly than elsewhere. Asia had the lowest rate of increase by continents, with Africa next. White continents had 39·6 of the world's total, about 9 per cent of which were English-speaking whites.

Increasing Requirements

Consumption of every kind of energy to-day (including food) needed the equivalent of a gross yearly intake of $4{,}000 \times 10^6$ tons of coal. Energy sources (apart from human and animal labour) were: solid fuel, 56 per cent; liquid and gaseous fuel, 37 per cent; water power, 7 per cent. Usage per head in coal equivalent ranged from 9 tons in the U.S.A. to 0·2 ton in India and China. In Great Britain the figure was just over 4 tons, of which 3 tons was taken by transport and industry. In all countries the demand for electricity was growing more rapidly than for other forms of energy in relation to total consumption and in the U.S.A. it was almost doubled every 10 to 12 years.

Materials for Electrical Industry

Progress of the electrical engineering industry was closely related to the supply of certain basic minerals, which were being supplied increasingly from underdeveloped countries. Iron ore, in greatly varying quality, quantity and accessibility, existed in every continent and rich deposits in several countries were almost untouched. Vast resources of low-grade ores, e.g. in Southern Rhodesia, might eventually become valuable. Deposits in the United Kingdom were of rather poor quality and 39 per cent of needs had to be imported. Only 6·5 per cent of U.S. consumption of manganese in 1950 was produced there; the shortfall was approximately the same as the total output of Africa, where consumption amounted to only 2 per cent.

China possessed nearly nine-tenths of the world's reserves of tungsten. Chief sources for that used in the U.K. were Portugal, Bolivia, Burma and Australia. Europe, especially the U.K., largely depended for its copper supplies on the U.S.A., Chile, Northern Rhodesia, U.S.S.R., Belgian Congo and Canada, annual production being in that order; Africa used only 3·3 per cent of its copper output and exported the remainder. Commercial production of aluminium from bauxite required abundant cheap electric power and Canada, which was wholly dependent upon Caribbean bauxite, was a major producer. The British-Canadian aluminium plant, as part of the Volta River project on the Gold Coast, should provide an additional supply for Western Europe.

South-east Asia was the major source of tin, but considerable resources existed in Africa and Bolivia. The chief reserves of lead were found in Australia, U.S.A.,

Canada, Peru and Mexico, but the second largest (U.S.A.) was estimated to have only fifteen years' supply. Mica came chiefly from India and Pakistan, but deposits existed in several other countries. Large deposits of chromite (for chromium) were to be found in Southern Rhodesia, South Africa and Sierra Leone.

Mr. Metcalf then drew attention to Uganda, where copper, pyrochlore (for niobrium used in jet-engine construction), aputite (for phosphates) and magnetite were among the native minerals. The power station at Jinja, where the Nile issued from Lake Victoria, was associated with the largest reservoir (as large as Scotland) used anywhere for electricity generation. The first of ten 15 MW turbines was expected to be in commission next year. The power was to be employed in smelting copper and magnetic ores, and in operating cement and textile plants.

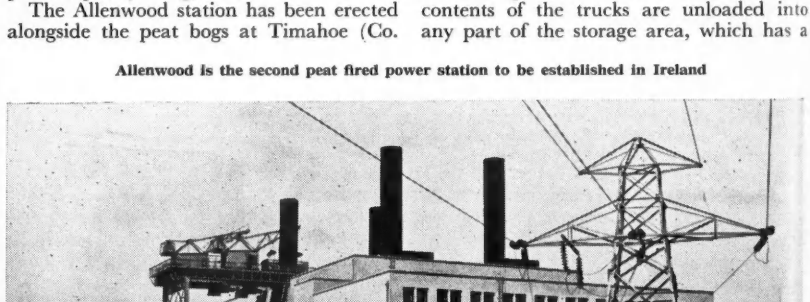
He concluded by discussing possible effects of the impact of Western civilization and industries on primitive peoples and suggested that young engineers should offer with missionary zeal their services to technical aid projects, at the same time thus enlarging their own engineering experience.

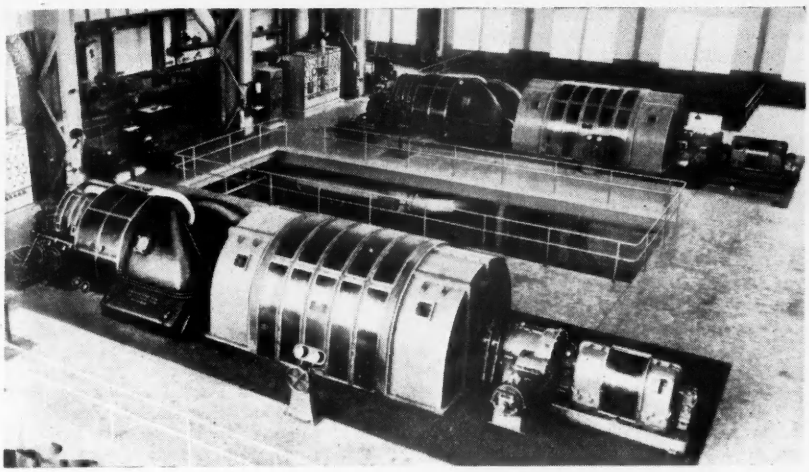
Peat Fired Power Station

ON 15th October the Allenwood power station of the Electricity Supply Board, Ireland, was officially inaugurated by Mr. Sean Lemass, Minister for Industry and Commerce, Ireland. It is the second peat fired power station to be established in Ireland, with a present generating plant capacity of 40,000 kW. The first station, at Portarlington, was commissioned in 1950 and has a generating plant capacity of 25,000 kW.

The Allenwood station has been erected alongside the peat bogs at Timahoe (Co. Kildare) and it is designed to use the peat from these bogs. The peat from an area of 6,000 acres is conveyed to the generating station in 3ft gauge fuel trains made up of open trucks of the cage type, and each of 5 ton capacity. At the station the peat is weighed, and samples are taken for analysis and for determination of the moisture content. It is then either fed directly to the boiler house bunkers or taken to the fuel storage site. In the latter case the contents of the trucks are unloaded into any part of the storage area, which has a

Allenwood is the second peat fired power station to be established in Ireland





The turbine room at Allenwood

capacity of about 50,000 tons, by means of an electric bridge crane which lifts each truck from its bogie, conveys it to the required position and tilts the truck to allow a hinged door to open automatically and thus discharge the peat. The truck body is then replaced upon its bogie.

If fuel is required to be unloaded directly into the boiler house bunkers, the trucks are run directly to ground level at the boiler house and raised from their bogies by two Oerlikon jib cranes which are located on the boiler house roof. The peat is then discharged from the tilted truck into individual bunkers which serve one of the four boilers immediately below. Sixty truck loads of peat are required to fill one boiler bunker, the capacity of which is nearly 300 tons. Each of these steel boiler bunkers, supplied by the Colville Constructional Co., converge at the bottom to a vertical shaft through which peat is guided and conveyed down to the moving grate of the stoker.

The four boiler units are of the Babcock & Wilcox standard C.T.M. type, each having a normal output of 125,000 lb/hr of steam. The steam conditions are 425 lb/sq in and 825 deg F. The normal heating surface of each boiler is 10,600 sq ft and that of each superheater is 5,830 sq ft.

The average thickness of the fuel bed is about 18in, and the amount of fuel consumed per kWh is 2·64 lb, with a moisture content of 30/32 per cent. The furnace fire-doors which govern the fuel-bed thickness are water-cooled—this being necessary in view of the fact that ignition takes place at the entrance to the combustion chamber and the doors would, if not water-cooled, become too hot to be operated satisfactorily. Each boiler is equipped with two f.d., one i.d. and two secondary fans manufactured by James Howden & Co., Ltd.

Two Howden-Ljungstrom air-preheaters are provided per boiler, each having 10,850 sq ft of heating surface. The boiler feed pumps were manufactured by Mather & Platt, Ltd. The boiler mountings and fittings are mostly of Dewrance manufacture, and feed level control is carried out by Copes feedwater regulators. The instruments and instrument panels for the boilers were manufactured by the Electroflo Meters Co., Ltd.

The generating plant, supplied and installed by the General Electric Co., Ltd., comprises two turbo-alternators, arranged side by side in the turbine hall, each of 20,000 kW capacity, with condensers and feed heaters, together with evaporating and de-aerating plant. The turbines are the normal axial-flow type.

Each single-shell condenser has a total surface of 20,000 sq ft, and the condensing, feed heating and evaporating plant was

supplied by Worthington-Simpson, Ltd. The cooling tower is of reinforced concrete hyperbolic construction and is 286ft high and 205ft in diameter at the base; it has a water capacity of 2·4 million gal/hr, sufficient for the two generating sets. This cooling tower, together with the station buildings, was constructed by the Irish Engineering & Harbour Construction Co. to the design of Mouchel & Partners.

The raw water supply is obtained from the Grand Canal at a distance of about half a mile from the power station, and is pumped direct for cooling tower make-up, and also delivered to three large tanks on the boiler house roof for the remaining supplies to the station. The water contains a moderate amount of suspended matter, and has an alkalinity hardness, most of which is due to calcium bicarbonate. For the boiler feed make-up Candy lime-soda softening plant is installed, having a capacity of 3,000 gal/hr, the treatment comprising the addition of lime, soda ash and sodium aluminate. Softened water is also used for domestic purposes and is pumped to a separate storage tank. As a precaution, a small dose of chlorine is applied to this water in the form of hypochlorite solution.

The alternators generate current at 10,500 V, 50 c/s. This is stepped up to 110 kV through the transformer plant and is transmitted to the Inchicore and Portlaoighise transformer stations.

The two 20,000 kVA and three 3,000 kVA transformers are of B.T.H. manufacture, while the 110 kV and 10 kV switchgear is of the air-blast type and was supplied by Brown-Boveri, who also provided the 380 V switchgear and control gear.

For the power station auxiliaries there are over 50 totally-enclosed, fan-cooled, motors ranging from 1 to 340 h.p. and representing a total output of nearly 4,500 h.p. All the motors are arranged for direct-on-line starting.

NEW TELEVISION TRANSMITTERS

Crystal Palace Contract

THE B.B.C. has ordered both vision and sound transmitters from Marconi's Wireless Telegraph Co., Ltd., for the new London television station at Crystal Palace, which will replace the existing station at Alexandra Palace. The new station will take about two years to build. When completed, the Crystal Palace will be the world's most powerful television station operating in the frequency band 42–88 Mc/s. It will also be the first time television transmitters have been used in parallel—on the same principle as the Third Programme transmitters. The coverage given by this station is expected to be much larger than that of Alexandra Palace and will bring some of the existing "fringe" areas into full range.

Crystal Palace will have two 15 kW vision transmitters designed for parallel operation with a combined output of 30 kW. The effective radiated power of this station is expected to be between 200 and 250 kW. In order to achieve this the B.B.C. will, for the first time, use a high gain aerial system, with a transmitter output power which is only 60 per cent of the regional transmitters.

The vision transmitters are a new design built around a new type of tetrode valve being manufactured for Marconi's by their associate, the English Electric Valve Co., Ltd., which simplifies the design and in consequence considerably reduces the physical size. They will occupy only about a quarter of the floor space of those at Alexandra Palace and Holme Moss and about half the floor space of those at Kirk o'Shotts and Wenvoe. The necessary adjustments to the transmitter are made from the adjoining control room. This room will be equipped with a special control desk incorporating controls for starting and stopping both vision and sound transmitters. The transmitter drive, input and monitoring equipment will be mounted in the same room. These transmitters are part of the latest range designed by Marconi's for the export market and can be used on either British, American or other standards. The two 4½ kW sound transmitters which will also operate in parallel are being designed specially to meet the B.B.C.'s requirements.

Congo Railway Electrification

Work is now proceeding on the electrification of the railway line from Tenke to Kolwezi, in the Katanga Province of the Belgian Congo. This will form a continuation of the already electrified line from Jadotville to Tenke, which was put into operation last October. It is hoped to complete the scheme by the end of this year.

OVERSEAS ELECTRICAL TRADE

Little Change in Export Position in September

ELECTRICAL export trade in September followed much the same pattern as in August. The total, amounting to £12,583,900, was practically the same as in the previous month (£12,571,887) but was £1,131,687 lower than in September, 1952. Despite this decline in business compared with the corresponding month of last year it will be seen on reference to Table I that nearly half the items classified show improvements. In particular the sections of the market concerned with submarine telegraph and telephone cables; telegraph, telephone and signalling apparatus; components and parts; lamps; mercury arc rectifiers; washing machines, vacuum

TABLE I.—ELECTRICAL EXPORTS

Class	September, 1952	September, 1953
	£	£
Telegraph and telephone cables and wires (submarine)	33,045	182,611
Ditto, not submarine	769,203	331,154
Cables and wires, paper insulated	895,606	621,157
Ditto, rubber insulated	466,912	284,913
Ditto, cotton, silk or artificial silk insulated	59,899	27,626
Ditto, enamel, glass or asbestos insulated	64,869	55,357
Ditto, other	280,410	177,787
Commercial radio apparatus	751,314	1,082,283
Domestic radio apparatus	361,764	219,948
Telegraph, telephone and signalling apparatus	1,134,538	1,299,850
Loudspeakers and microphones	44,363	22,714
Radio, telecommunication and electronic apparatus components and parts, n.e.s.	296,252	477,381
Other radio, telecommunication and electronic apparatus	266,155	252,820
Cathode ray tubes	12,951	18,277
Other valves	284,710	133,874
Carbons	10,749	18,110
Lamps, exceeding 24 V	57,782	73,693
Ditto, not exceeding 24 V	16,311	24,367
Other lighting appliances	331,446	354,309
Primary batteries	164,428	132,511
Parts other than carbons	18,915	31,347
Accumulators for motor vehicles	118,675	163,818
Ditto, traction	7,392	12,405
Ditto, radio	2,874	1,113
Other portable accumulators	49,210	23,245
All other accumulators	33,570	18,278
Parts and accessories	48,083	43,783
Cooking appliances	74,953	82,183
Heating appliances	66,178	59,949
Parts and accessories for cooking and heating appliances	80,602	64,404
Flat irons	45,604	62,714
Commercial electrical instruments	104,056	119,908
House service meters	90,624	75,934
Time recorders and time switches	12,952	12,812
Other electrical instruments	130,937	105,862
Electro-medical apparatus (not X-ray)	39,178	28,441
X-ray apparatus, other than tubes and valves	63,085	62,144
Vacuum tubes	57,897	65,305
Permanent magnets	34,564	29,839
Insulating cloth and tape	39,285	45,070
Other insulating materials	76,119	60,592
Unclassified electrical goods and apparatus	702,795	489,430
TOTAL, electrical goods and apparatus	8,263,255	7,449,318
Diesel driven generators, not exceeding 10 kW	322,092	63,253
Ditto, over 10 kW to 65 kW		80,543
Ditto, over 65 kW to 200 kW		94,467
Ditto, exceeding 200 kW	136,835	169,135
Other generating sets	71,127	221,758
Generators and parts of generators	868,990	447,978
Motors, railway, tramway and trolley-bus	2,558	16,964
Ditto, others not over ¼ h.p.	104,061	119,444
Ditto, over ¼ h.p. but under 1 h.p.	43,406	43,881
Ditto, from 1 h.p. to 250 h.p.	406,057	379,416
Ditto, exceeding 250 h.p.	105,279	75,196
Ditto, parts	77,109	114,852
Converting machinery	21,618	27,168
Transformers, including coils	839,102	895,224
Mercury arc rectifiers	42,832	78,599
Motor starting and controlling gear	182,215	184,821
Switchgear and switchboards (not telegraph and telephone)	1,155,102	1,061,167
Electrical machinery, n.e.s.†	282,732	48,173
TOTAL, electrical machinery	4,661,115	4,122,039
Washing machines (not exceeding 150 lb weight)*	331,609	318,661
Ditto (over 150 lb but not exceeding 250 lb weight)*		113,160
Ditto, parts	41,563	32,597
Vacuum cleaners	90,258	133,378
Ditto, parts	31,022	15,705
Other electrically operated portable appliances	109,664	189,387
Portable electric tools	73,571	88,205
Electrical pottery and glassware, including insulators	71,683	57,622
Electrical conduit tubes and cased tubes	41,847	63,828
GRAND TOTAL	13,715,587	12,583,900

* Not separately distinguished in 1952.

† The two figures are not comparable.

cleaners and other portable appliances give some cause for satisfaction.

India was by far the best customer for electrical goods and apparatus, taking £892,477 out of a total of £7,449,318, with South Africa (£598,809) and Australia (£525,581) some way behind. An interesting development is an increase from £125,336 to £317,157 in purchases by Belgium, which is sixth in the list of buyers, beneath Canada (£373,014) and New Zealand (£326,443). Holland also substantially increased its business, and so did Italy, Burma, the U.S.A. and China. There were reduced shipments to Turkey (from £301,837 to £7,505), Greece (from £80,551 to £9,708), Egypt (from £104,673 to £46,899) and Colombia (from £63,134 to £6,227). Full details of destination are given in Table II.

Table II.—Distribution of Electrical Goods and Apparatus

Destination	Sept., 1952	Sept., 1953
	£	£
Channel Islands	45,905	31,364
Gibraltar	9,428	4,753
Malta and Gozo	5,782	19,553
Cyprus	47,996	27,900
Gold Coast	52,534	63,447
Nigeria	98,221	106,607
Union of South Africa	860,968	598,809
Northern Rhodesia	27,776	39,456
Southern Rhodesia	142,239	103,996
British East Africa	260,212	158,029
Bahrein, Qatar and Trucial Oman	26,390	27,418
Kuwait	66,693	148,378
India	831,266	892,477
Pakistan	124,306	62,661
Malaya	302,796	288,942
Ceylon	78,844	116,221
Hong Kong	81,807	44,037
Australia	617,171	525,581
New Zealand	431,145	326,443
Canada	310,043	373,014
British West Indies	115,012	123,631
Anglo-Egyptian Sudan	64,192	49,607
Other Commonwealth Countries	137,315	213,391
Irish Republic	251,432	183,644
Soviet Union	13,158	22,085
Finland	88,549	18,928
Sweden	354,544	266,456
Norway	101,332	167,263
Iceland	5,513	2,882
Denmark	67,126	94,330
Poland	25,499	7,936
Western Germany	103,624	63,954
Netherlands	198,022	285,967
Belgium	125,336	317,157
France	124,160	87,675
Switzerland	40,222	43,638
Portugal	88,341	22,543
Spain	43,407	77,825
Italy	88,628	167,723
Austria	64,674	69,413
Czechoslovakia	3,300	2,611
Yugoslavia	36,108	35,791
Greece	80,551	9,708
Turkey	301,837	7,505
Portuguese East Africa	12,169	7,167
Syria	18,797	12,401
Lebanon	43,460	13,391
Israel	74,263	27,581
Egypt	104,673	46,899
Arabia	32,234	5,441
Iraq	136,334	91,577
Iran	16,102	6,066
Burma	51,193	125,849
Thailand	39,464	49,684
Indonesia	54,000	21,158
China	191	13,983
United States of America	87,463	143,662
Colombia	63,134	6,227
Venezuela	117,356	119,912
Peru	24,955	21,317
Chile	28,186	38,201
Brazil	95,009	77,144
Uruguay	18,847	21,216
Argentine Republic	22,167	92,403
Other Foreign Countries	279,854	206,690
Total	8,263,255	7,449,318

In recent months the picture regarding electrical machinery exports has changed somewhat. British East Africa (£176,214), and Canada (£93,679) were the best customers for generators, and though South Africa (£89,319) and Australia (£87,270) are still, as they have frequently been, the most important markets for motors. Holland has increased its demands from £46,090 to £80,662 to take third place in the list. South Africa (£504,069), Australia (£395,708) and India (£343,091) between them accounted for a considerable portion of the £2,295,652 worth of "other electrical machinery" disposed of.

Imports of electrical goods and apparatus still tend to increase. The September total of £699,236, which is £20,764 above the figure for the corresponding month last year, includes £247,766 for radio, telecommunication and electronic apparatus, £177,486 for valves, £52,650 for electrical instruments and £43,926 for X-ray apparatus and vacuum tubes. Electrical machinery imports comprised generators (£25,394), motors (£42,564) and "all other sorts" (£54,130).

Middle East Trade Mission

THE President of the Board of Trade announced in a written Parliamentary reply last week that a mission of prominent business men would leave next month for the Middle East where there were important markets for British exports. These markets include Iraq, Kuwait and Saudi Arabia which were receiving considerable sums from oil royalties which were being used to finance large-scale development programmes, as well as Syria and the Lebanon which, though not oil producers, were substantial and expanding markets.

The leader of the mission would be Sir Edward Benthall and among the members would be Mr. D. Maxwell Buist, export director of the B.E.A.M.A.

COMMERCE and INDUSTRY

Plastics in the Tropics

BEHAVIOUR of polythene (polyethylene) under tropical conditions is the subject of a report (issued by the Ministry of Supply) on the latest of the tests being carried out at the instance of the Ministry and British Plastics Federation sub-panel of the Inter-Services Plastics panel. Evaluations of the effect of climatic conditions in the tropics on some properties of plastics are continually being carried out and a report on the result of tests on expanded plastics has already been published. Dr. W. E. de B. Diamond, director of the British Plastics Federation, says that these are the first reliable results obtained about polythene, because in spite of the development of tropical chambers for testing, it is difficult to simulate exact conditions.

The tests are regarded as particularly important, as polythene is specified for a variety of h.f. electrical applications because of its low power factor and permittivity; it is also suitable for such purposes as packaging and water-piping because of its ductility and inertness. The report shows that the inclusion of 0·1 per cent of carbon black in polythene provides a considerable measure of protection against deterioration of properties by light.

Conclusions of the report are that polythene is resistant to the moisture of tropical climates but is susceptible to the actinic effects of the tropical sun. These effects, however, are greatly reduced by carbon black.

Large Steelworks Contract

Steelworks Order

The General Electric Co., Ltd., has received a contract, valued at £300,000, from the Steel Company of Wales for the complete electrical equipment for two 42in temper mills which are to be installed at the new Velindre Works at Morriston, near Swansea. This order follows the completion of a similar contract for the two temper mills, now in commission, at the Trostre Works, which are the first in this country to operate at strip speeds up to 4,000 ft/min. The new temper mills are being built by the Davy and United Engineering Co., Ltd., of Sheffield, and each will be equipped with two 1,000 h.p. motors for the main stand drives, two 500 h.p. and two 250 h.p. tension roll motors, and two 300 h.p. motors for the uncoiler and reel. The control scheme for these drives will be similar to that adopted for the Trostre plant, and will embody G.E.C. cascade control exciters working in conjunction with electronic amplifiers. McLellan and Partners, the consulting electrical engineers for the Abbey, Margam and Trostre plants of the Steel Company of Wales, are also acting as consultants for the Velindre project.

Communal Laundry

At the L.C.C. housing estate at Heathside, Lewisham, a new communal laundry has just been opened which will be used by a hundred present tenants, and is also large enough to cater for the needs of further families as the estate develops. Fourteen cubicles are provided and equipped with English Electric washing machines. Each cubicle has a large sink and draining board, and roomy airing cupboards are provided in an alcove off the

Communal laundry at Lewisham where English Electric washing machines have been installed

main laundry. Mrs. Bellamy, senior demonstrator of the English Electric Co., Ltd., was present at the opening, where she showed an interested audience of mothers and children how to operate the washing machines.

Aircraft Beacon for Switzerland

The Swiss civil aviation authorities have ordered a very high frequency omni-directional radio range (VOR) beacon from Marconi's Wireless Telegraph Co., Ltd., through Hasler S/A, the company's agents in Berne. This will be the first production model manufactured by any British company. The beacon will be delivered early in the coming year.

Argentine-Hungarian Trade

Under a recently-signed trade pact Hungary has undertaken to supply goods to Argentina of an annual value of $30 million including power station plant, $3 million, communications equipment, $1·8 million and electrical material, $1 million.

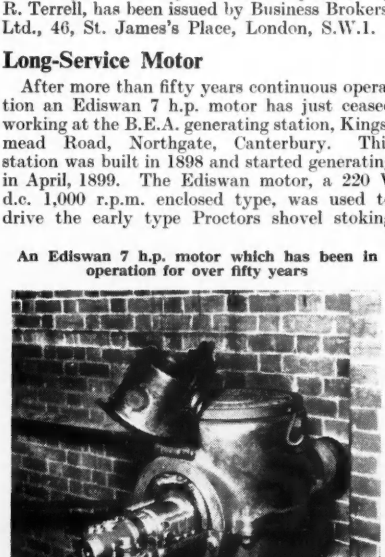
Private Companies and Death Duties

A memorandum on "Death Duties and Their Effect upon Privately Owned Companies," by R. Terrell, has been issued by Business Brokers, Ltd., 46, St. James's Place, London, S.W.1.

Long-Service Motor

After more than fifty years continuous operation an Ediswan 7 h.p. motor has just ceased working at the B.E.A. generating station, Kingsmead Road, Northgate, Canterbury. This station was built in 1898 and started generating in April, 1899. The Ediswan motor, a 220 V d.c. 1,000 r.p.m. enclosed type, was used to drive the early type Proctors shovel stoking gear and the economizer scraper gear and was running 24 hours per day for about twenty-five years. Later it drove the economizer only and was in operation daily for periods up to 12 hours. During all this time the motor has not required any major repairs.

An Ediswan 7 h.p. motor which has been in operation for over fifty years



E.I.B.A. in 1952

The 1953 Year Book of the Electrical Industries Benevolent Association, 32, Old Burlington Street, London, W.1, has been issued. In a foreword Mr. H. Drake, the 1952–53 president, appeals for more regular subscriptions to the Association's funds; he thinks that reliance on "special" efforts may be misplaced. As usual the names of those connected with the Association are set out and typical cases are quoted in which necessitous members of the industry have been helped.

The revenue account shows a total income for 1952 of £56,116 (against £52,458 in 1951), of which subscriptions and donations accounted for £48,053 net (against £41,148). After the payment of £37,056 (£39,955) in grants, pensions and allowances, and meeting expenses, a credit balance of £5,839 remained (against £1,016).

New Rhodesian Copper Mine

Bancroft Mines, which has been incorporated in Northern Rhodesia with an authorized capital of £5 million, is to acquire from the Rhokana Corporation certain special grants of mining rights in areas situated near the Belgian Congo border, about 14 miles north-west of Nchanga. It is proposed to develop and equip a copper mine to produce about 150,000 short tons of ore a month at a total cost estimated at about £12 million, inclusive of working capital. Production is expected to begin in 1958.

Die Casting

We have received from Dyson & Co., Enfield (1919), Ltd., Southbury Works, Ponders End, Enfield, Middlesex, a 52-page book containing a record of the development by the company of gravity and pressure die casting. Containing many well-produced illustrations, the publication covers the story of die casting from the selection of the alloy to the final polishing, plating and finishing processes.

Ionizing Radiations

An 18-page pamphlet, "Precautions in the Use of Ionizing Radiations in Industry" (Factory Form 342) is being published at the end of this month by the Factory Department of the Ministry of Labour and National Service (H.M. Stationery Office, price 2s).

The introduction deals briefly with the many different uses of ionizing radiations which are increasingly helping the industrialist to examine and improve the quality of his products and to increase the speed and efficiency of, and gain greater insight into, the mechanism of his chemical and engineering processes.

Fixed or mobile X-ray sets employing voltages of up to two million are in use by some two to three hundred firms for radiographic examination for faults, while another considerable use is for the fluoroscopic examination of such manufactured articles as sparking plugs, radio-valve assemblies, cables and high voltage insulators.

A considerable use of radioactive material, chiefly of the radio-isotopes Thallium 204 and Strontium 90, is now made for eliminating troubles which bedevil so many industrial processes which handle highly insulating materials, causing cut lengths to wrap and jam round rollers, etc.

The main body of the document is taken up with the precautions which should be adopted by all industrial workers liable to be exposed to ionizing radiations.

Motor Show Luncheon

Speaking at the annual Exide press luncheon held on the opening day of the International Motor Show at Earls Court, Mr. H. V. Schofield, director of Chloride Batteries, Ltd., said that the company's organization had been built on a solid foundation of prompt and efficient service. In launching the new "Silver Exide" car battery at the beginning of this year they aimed at giving the motoring public better value for money than it had ever had before. The development of the "Porvic" separator had removed the major cause of premature battery failure. The use of "Porvic" also contributed substantially towards dollar savings as it was no longer necessary to import wood material for separators from North America, and it had created employment for a great many people here at home. Despite extensive competition the company was maintaining its supremacy in the export field.

Domestic Electrical Appliances

In response to numerous requests we are reprinting the schedules of appliances included in our Special Domestic Issue of 16th October. It will assist us in assessing the demand if other readers who require the reprints will let us know how many copies they would like. These will be supplied at a nominal charge.

Electricity in Weaving

With the intensification of foreign competition the modernization of the British textile industries has become an urgent matter and there is little doubt that modernization can be equated with electrification. To help to convince textile manufacturers of this the British Electrical Development Association (2, Savoy Hill, W.C.2) has added to its series of booklets on various aspects a new one, "Electricity in Weaving." This 24-page publication sets out, with illustrations, the advantages of the electric drive and why it pays mill-owners to take a public electricity supply when it becomes necessary to replace their own plant. There are also brief sections on lighting, air conditioning and materials handling. Installation, control and metering are among the other subjects touched upon. Copies of the booklet are obtainable from the Association or from the North Western Electricity Board (Cheetwood Road, Manchester, which is associated with the production of the series.

Detroit Rejects Swiss Offer

The *Electrical World* (New York) reports that the Public Lighting Commission of Detroit has rejected all tenders for a 50 MW turbo-generator for its Mistersky station. Earlier it had refused the lowest offer, that of the Brown Boveri Co. (Switzerland) on the ground that the company had had no previous experience in building the type of generator required. New specifications to be issued will demand that tenderers shall have had suitable experience of constructing the type of generator called for.

Electronic Printed Circuits

In a paper "Printed Circuits: Some General Principles and Applications of the Foil Technique," which Dr. Paul Eisler read before the London Section of the British Institution of Radio Engineers last week, the author first discussed universal applicability and compatibility with specialization as the criteria for the choice of a suitable method of producing printed circuits, and concluded that the foil technique alone passed this test. The major production methods of the foil technique, namely, printing, etching, fusing, mechanical patterning, transfer, and multilayer technique, were all described, and finally the author gave a detailed account of a number of characteristics of foil conductors which made them universally usable, and mentioned examples of applications featuring some of these characteristics.

"Electricity in Industry"

The first issue of a technical review entitled "Electricity in Industry" has been published by the Lancashire Dynamo Group Publicity Services, St. Stephen's House, Victoria Embankment, London, S.W.1. The aim of the new publication is to discuss some of the problems which are encountered in the manufacturing world and describe methods by which they have been overcome. It is also hoped to provide from time to time information about methods of production used in various engineering works.

T.S.S. "Gothic"

When the Queen and the Duke of Edinburgh require the services of their staff aboard the T.S.S. *Gothic* on their Australasian tour they will use a luminous call system made by Gent & Co., Ltd., Leicester. The *Gothic* was previously

fitted throughout with Gents' luminous call equipment but owing to the considerable re-arrangement of accommodation which was necessary, over thirty pieces of additional equipment have been specially installed. Gents' have also been responsible for a similar luminous call system for installation in the Royal Yacht.

Works Visit

During his industrial tour of the North Western Region, Mr. Duncan Sandys, M.P., Minister of Supply, visited the Prescot Works of British Insulated Callender's Cables, Ltd., on 22nd October. He was received by Mr. H. J. Stone, director and deputy chief executive, Mr. F. Waine, director, Mr. E. Bowyer, manager (production), and Mr. L. R. B. Spence, Prescot works manager. The Minister toured the copper refinery, the rolling mills and wire drawing departments, and the power and telecommunication cable manufacturing departments.

Abbreviated B.E.A. Report

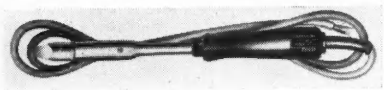
The British Electricity Authority makes a practice of producing for all its employees a well-illustrated summary of its annual report in an easily-digested form. This year's report is now available to the public in an attractive cover (price 1s) from the Electricity Boards' service centres.

Railway Signalling Order

The Siemens and General Electric Railway Signal Co., Ltd., has been awarded the contract for the supply and installation of colour-light signalling on the Glasgow Central low level lines of the Scottish Region, British Railways, between Partick Central and Strathclyde Junction, and including the branch lines from Stobcross Junction and Bridgeton Cross Junction to Kelvinbridge and Parkhead Stadium respectively; the signalling will extend over approximately five miles.

Domestic Soldering Iron

In our Special Domestic Issue of 16th October we referred to several small soldering irons suitable for use on various household jobs. We omitted to mention the "Solon" irons produced by W. T. Henley's Telegraph Works Co., Ltd., 51–53, Hatton Garden, London, E.C.1. These are made in three sizes (five



Henley 65 W "Solon" soldering iron

types); probably the most suitable for domestic use is the 65 W iron (illustrated), with oval tapered bit; it weighs only 9¼ oz.

The name of Falk, Stadelmann & Co., Ltd., 91, Farringdon Road, London, E.C.1, should be added to the list of lighting fitting manufacturers given in our Special Domestic Number.

Trade Announcements

Siemens Electric Lamps & Supplies, Ltd., is opening a new sales depot on 2nd November at 8, Albion Street, Leicester (telephone : Granby 1122), which will carry comprehensive stocks, and have a van delivery service. The depot will be under the control of Mr. W. J. R. Yeates of the company's Birmingham Branch, and will be managed by Mr. N. T. Anthony.

Thermodare (Great Britain) has moved to 79-80, Petty France, London, S.W.1 (telephone : Abbey 1060 and 3348).

Catalogues and Lists

Burgess Products Co., Ltd., Micro Switch Division, Dukes Way, Team Valley, Gateshead, 11.—Illustrated folder dealing with recent micro-switch developments by the company (MS.3).

W. T. Henley's Telegraph Works Co., Ltd., 51-53, Hatton Garden, London, E.C.1. —Two folders giving details of outdoor service fuses (47/A) and a new double-pole connector box (43/A).

Walter Logan & Co., Ltd., 26, Downing Court, Brunswick Square, London, W.C.1.—Illustrated catalogue of "Vossloh" watertight fluorescent lamp fittings.

Volex Electrical Products, Ltd., Salford, 6.—Catalogue illustrating a range of the company's electrical accessories and lampshades, together with price list.

Geo. W. King, Ltd., Stevenage, Herts.—Illustrated brochure announcing the new "P.C.P." overhead chain conveyor (PCP 853).

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"Clymax" switches and switch sockets.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by the Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

MOTOR SHOW

Electrical Aids to Safety on the Roads

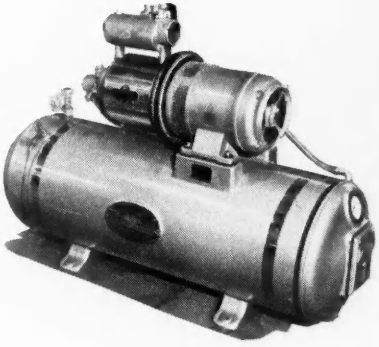
IT has, of course, been inevitable that popular attention at the International Motor Exhibition at Earls Court, London, should have been concentrated on the more spectacular electrical developments such as are epitomized in the Lincoln "X-100—Car of To-morrow," with its moisture sensitive electrical device for closing the roof in the event of rain, electrical power assisted emergency handbrake, two front power seats with six-way adjustment, built-in electrically operated jacks for each wheel, electrically opened and closed bonnet and luggage compartment lids, "Dictaphone," "ship-to-shore" type telephone, electric shaver and a signal seeking radio with separate controls for front and rear seat passengers.

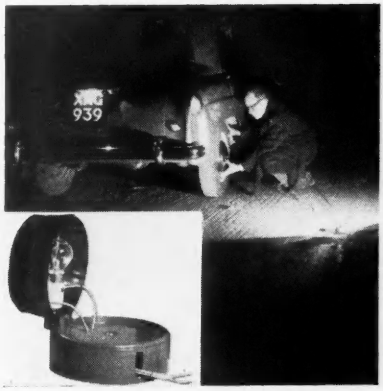
With an electrical system covering twenty-four motors, forty-four electronic valves, fifty light bulbs, ninety-two control switches, twenty-nine solenoids, fifty-three relays, twenty-three circuit breakers, ten fuses and eight miles of wiring, this car is purely experimental and will not itself be produced for sale to the public. It is not, however, to these "super refinements" that manufacturers as a whole have been directing their activities. Rather it is towards making the motoring of the average driver safer and more comfortable and towards improving the servicing facilities of the garage proprietors.

Lighting has received special attention and particularly interesting are the "Road-scene" models which show equipment in operation on the Lucas stand and provide an effective means of comparing good and bad rear lighting, main and "dipped" headlight beams, fog lamps and long-range driving lamps. "See and Be Seen" is the new slogan introduced this year in the cause of road safety, and the Lucas range of equipment which provides the means of carrying this safety slogan into effect includes "Double-dipping Block-pattern" lens headlights; two new miniature auxiliary driving lamps less than 6in in diameter, one projecting a concentrated beam ahead and its block-lensed companion for piercing fog or the night darkness, with a scientifically designed wide spread flat-topped beam; and bigger and brighter rear and stop tail lamps, together with reflex reflectors.

Another new matched pair of miniature driving lamps is to be seen on the Notek stand. Identical in appearance except for

Left: **The Burtonwood "Hydrovane" rotary compressor is claimed to be considerably more efficient than the reciprocating type.** *Right:* **The Belling & Lee "Save-a-Life" lamp enables one to see to change a wheel on a busy road in the dark, a red flashing light warning oncoming traffic**





the glass lens, they are only 5¾in in diameter and 2¼in deep: the "Farlite" gives a pencil beam, the "Nearlite" a non-dazzle flat top beam for fog, etc. Simms Motor Units, Ltd., show an improved stop/tail lamp while Belling and Lee, Ltd., make a further contribution to safety with their "Save-a-Life" unit which provides a large field of continuous white light for wheel changing, etc., and at the same time a red flashing signal light as a warning to other road users.

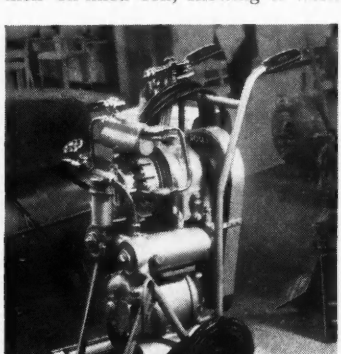
Flashing direction indicators have become a feature of major interest. London Bankside Products, Ltd., show new "Sparto" models, together with a new steering column switch, and a Lucas working demonstration gives an opportunity for visual appreciation of this type of indicator. The latest Lucas semaphore type trafficator has been strengthened and simplified: it has an easily detachable arm to facilitate servicing.

Television viewers will be pleased to see that the Champion Spark Plug Co., Ltd., has incorporated built-in resistors in its sparking plugs to eliminate interference with reception. Similarly both K.L.G. Sparking Plugs, Ltd., and Lodge Plugs provide moulded plug covers with resistors for the same purpose. A new plug in the low price range is shown for the first time by the Wico-Pacy Sales Corporation, Ltd.

Delco-Remy-Hyatt make a special feature of their oil-filled coil, showing it working under a continuous water spray. A bi-metal six-way fuse box with an automatic overload cut-out is shown by Bosch, Ltd., while a display of C.A.V. marine electrical equipment includes a selection of totally enclosed generators for battery charging and lighting, with outputs from 250 to 1,320 W; starters of the "Axial" type, which give ample torque for turning over high compression oil engines; searchlights and spotlights; and heavy duty batteries for lighting and starting.

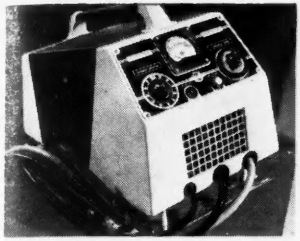
Several other manufacturers show marine generating plant. Petters AV1MA marine auxiliary unit comprises a single cylinder, water-cooled diesel engine developing 5 h.p. at 1,500 r.p.m., close-coupled to a 2·5 kW, 110 V d.c. generator. Lister's FRM1A auxiliary emergency generator incorporates an 8 h.p. engine with a 4·5 kW 220 V d.c. compound wound generator complete with switchboard. The 500 W Stuart Turner marine lighting set is suitable for about twenty-five lights for small cabin cruisers, etc.

Considerable improvements have been made in the design and construction of batteries during the past year. The "Silver Exide" standard car battery introduced in January by Chloride Batteries, Ltd.,incorporates the virtually indestructible "Porvic" microporous plastic separators, plate grids of a new lead alloy giving greater durability and resistance, improved active materials, and an attractively designed

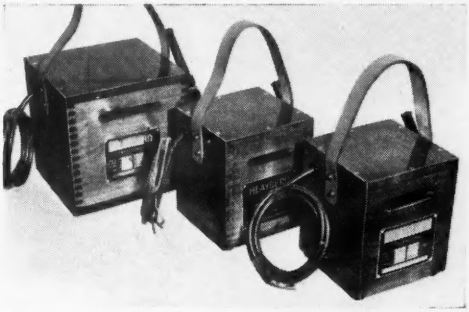


Above: **Partridge Wilson heavy duty engine starter**

Left: **The Romac D4XR compressor is designed to operate a small spray gun in addition to the tyre inflator**



Crypton " Portastart " starter and rapid charger can easily be carried in one hand



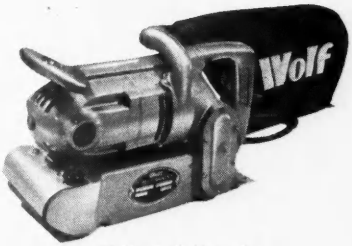
Heayberd low voltage safety transformers for operating inspection lamps and hand tools

container of tough, shock-resistant and leak-proof hard rubber. Every " Dagenite " battery in the Peto & Radford display is also fitted with separators of " Porvic."

In the " Crompton " car batteries shown on the Young Accumulator Co.'s stand a new design of grid made from " Nilcrode " alloy retains active material more securely, stays rigid and resists corrosion, while a new formulation of active material gives increased power, especially for cold starting. The " Dri-Stor " microporous separators incorporated are virtually indestructible and completely unaffected by immersion in acid. Moulded hard rubber containers have again been adopted, as well as larger connector bars with increased sectional area to give higher starting voltage; and non-splash vent plugs with finger grips designed for easy, speedy unscrewing. Longer life of the Lucas " King of the Road " battery is also ensured by the use of porous rubber separators and special grid alloys and the toughened " Milam " casing. " Fibrak " separators are employed in conjunction with fibre-glass retainer mats in the Oldham units.

A new car radio model incorporating drum tuning has been developed by E. K. Cole, Ltd. Other manufacturers showing car radio equipment include S. Smith & Sons (Radiomobile), Ltd., World Radio, Ltd., and Pye, Ltd., the last-mentioned company also supplying radio-telephone equipment suitable for all types of communication between vehicles and fixed points.

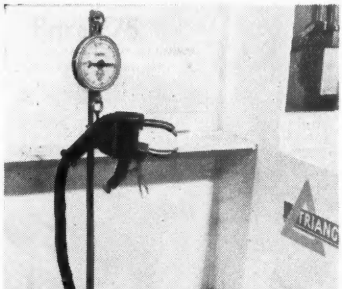
A considerable amount of new electrical apparatus can be seen in the transport service equipment section. Employing a new rotary technique and the use of oil to produce a seal, the Burtonwood " Hydro-vane " compressor has fewer working parts

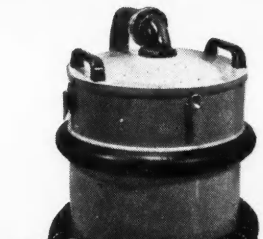


Wolf BS3 belt sander

than the reciprocating type and is considerably cheaper to produce: a 9 cu ft/min model is claimed to give as much compression as a 12 cu ft/min reciprocating model. Two new small compressors, one portable and one fixed, each with a displacement of about 2·5 cu ft/min and a maximum pressure of 150 lb/sq in are available from H.E.C. Compressors & Engineers, Ltd. Romac Industries, Ltd., also have two new models (one 5 cu ft/min 150 lb/sq in and the other 16 cu ft/min 200 lb/sq in). The Ingersoll Rand type 40 two-stage compressor with a 50 h.p. motor meets the demand for a compressor of greater capacity operating at 200 lb/sq in.

The new Partridge Wilson model SD combined 12/24 V engine starter will generally start the heaviest diesel or petrol engine without the assistance of the battery. A special plug fitting into a socket on the vehicles has a contact button built in so that, until it is pushed home and the starter button pressed, power is not applied to the battery or starter motor. The battery cannot therefore be damaged by being





Left: **The Triangle " Monoflex " lightweight head spot welder weighs only 14 lb including cable drag.**
Right: **Service Electric " Secomak " car valet vacuum cleaner for use in the servicing bays of garages**

left on charge by a forgetful driver or mechanic. The " Startall Major " shown by G.S.L. Products, Ltd., is another new engine starting equipment.

The " Portastart " hand portable engine starter and battery booster, which weighs under 50 lb and can easily be carried in one hand, is among a comprehensive display of Crypton equipment which also includes a new test bench claimed to provide the most complete facilities ever offered for car and light commercial vehicle service, various types of motor analysers, portable test meters, distributor analysers and testers, and commercial and home battery chargers. The Edison Swan Electric Co., Ltd., and S. Guiterman & Co., Ltd., are other exhibitors of battery chargers.

With the object of bringing to the notice of the smaller garage proprietor, etc., the availability of low-priced electric tools Black & Decker, Ltd., make a special feature of their wide " Utility " range. New Wolf products include a heavy duty valve refacer, a heavy duty 3in belt sander incorporating a powerful dust extractor, a 6in high-speed heavy duty portable grinder with a stock removal of over 100 per cent above other comparable makes, a 7in portable saw and a handy die grinder kit. The " Nibblex " jig saw for attachment to an electric drill is shown by Stevco, Ltd.

A new range of Heayberd l.v. safety transformers (25–750 VA) enclosed in portable wooden cases and complying with B.S. 794 : 1938 is suitable for operating small hand tools or inspection lamps.

Among welding plant the new Triangle " Monoflex " lightweight head remote spot welder weighs only 14 lb including cable drag. Another lightweight unit (22 lb) is the Ring Motors " Auto-Spot." Several other types of welding plants specially designed for the motor industry are seen on the A.R.O. Machinery Co.'s stand.

Intended for use in the servicing bays of garages, the Service Electric Co.'s " Secomak " car valet cleaners are mobile and provide a convenient solution to the problem of cleaning the insides of all types of vehicles.

A.S.E.E. Manchester Branch

The Manchester Branch of the Association of Supervising Electrical Engineers is holding its annual dinner and dance at the Denmark Hotel, Lloyd Street, Manchester, on 12th December. The guest of honour will be Mr. E. Lee, chairman of the Manchester Branch of the Electrical Contractors' Association. Tickets (22s 6d each) are available from the social secretary of the Branch, 74, Stephens Road, Withington Manchester, 20.

ELECTRICITY SUPPLY

Voluntary Load-Spreading in the Midlands

River Jordan Development Scheme

THE Midland Regional Board for Industry announced last week that there will be no compulsory load-spreading scheme for the Midlands during the winter. However, 3,000 industrial power consumers have been asked to co-operate voluntarily by helping to remove load from peak hours—8 a.m. to noon and 4 p.m. to 5.30 p.m.—from mid-November to the end of January, if possible by a 10 per cent reduction. Firms with private generating plant have been asked to use it to the full during peak hours. The Board's chairman, Major C. R. Dibben, said that the decision not to impose a compulsory scheme had been taken despite a report of the Joint Consultative Committee which had noted that the peak demand for power was likely to be greater in the Glasgow, Birmingham and Bristol grid control centres. Should the winter prove exceptionally severe and heavy power cuts become frequent, it would be necessary to review the position and make emergency arrangements.

Uskmouth Ash Disposal

Fears were expressed at a meeting of Newport Harbour Commissioners that the dumping of 5,000 tons of coal ash a week from the Uskmouth power station into the Bristol Channel would have an adverse effect on Newport Docks. The Usk River Board had written asking the views of the Commissioners on the proposal. Mr. John Davison, J.P., said that if a quarter of a million tons of ash from the new station were dumped each year in comparatively close proximity to the dredged channel some of it would drift back. If this continued for a number of years it was bound to be detrimental to the port. The chairman of the Commissioners, Mr. C. C. Jones, said that it was not proposed to do any dumping in the immediate future. What they had to worry about was the position in about nine years' time when the dumping area for the power station became full. The Commissioners decided to defer the subject until further information had been obtained.

Water Power in British Guiana

Negotiations have been concluded recently between the Government of British Guiana and British Guiana Consolidated Goldfields, Ltd., a concern assisted by the Colonial Development Corporation, for the installation of the Colony's first hydro-electric plant at the Tumaturmari Falls on the Potaro River. A new local company will be formed to operate the project.

Canadian Control Room Lighting

Lighting fittings for the control room at the Otto Holden generating station, Mattawa, Canada, are concealed behind a false ceiling made of 3ft square sheets of " Plexiglass "—a white opal plastic—supported on aluminium tee-bars. The underside of the ceiling is sand-blasted to lessen specular reflections. " Osram " cold cathode tubes (" Intermediate White ") are mounted 18in above the false ceiling in three rows of 22 units in industrial type triple

Control room at the Otto Holden generating station, Ontario, lighted by " Osram " cold cathode tubes concealed behind a false ceiling

tube reflectors. The 66 units, with transformers, capacitors and tubes, were supplied to the Hydro-Electric Power Commission of Ontario through the British General Electric Co. (Canadian), Ltd.

"T.V.A." Plan for Jordan

An irrigation and power plan for the River Jordan, prepared by the Tennessee Valley Authority with the support of the American State Department, was announced last week by the United Nations Relief and Workers Agency for Palestine Refugees (U.N.R.W.A.). The scheme, which would cost £43·3 million, seeks to utilize the waters of the river for the benefit of Israel, Jordan, Syria and the Lebanon. It has been produced after a study of the various projects considered since 1937. The present project would permit the resettlement of about 200,000 Palestine Arab refugees in Jordan and in the part of Palestine occupied by Jordan since the end of the Palestine war. Some 234,000 acres would be irrigated under the full plan.

The Tal-y-llyn Proposal

Replying to letters of protest against a proposal by the British Electricity Authority to investigate the possibilities of a pumped-storage power scheme in the Tal-y-llyn district, North Wales, Mr. Ernest Long, secretary of the B.E.A., gives an assurance, in a letter to the *Manchester Guardian*, that the planning authority for the area and other interested bodies will be kept fully informed.

He says that all that is taking place so far is that the B.E.A., in pursuance of its statutory duty to promote the use of all economical methods of generating electricity, is considering the possibilities of developing pumped-storage schemes. "In the examination of the somewhat limited scope of these possibilities, the Authority is seeking permission to sink trial borings on the Idris Estate, Cader Idris, as part of the preliminary investigations necessary in order to find out whether a pumped-storage development in this area would be practicable and economic and in the local and national interest. There is no certainty that the development will be proceeded with."

Monmouthshire Power Station Plan

Although the Magor and St. Mellons Rural District Council decided at a recent meeting to object to the proposal of the British Electricity Authority to build an electricity generating station at Rogerstone, Monmouthshire, it has now changed its mind. It was also reported a month ago that the local branch of the N.F.U. was opposed to the scheme but it is now understood that it does not intend offering any objection.

Originally the B.E.A. had intended building this 120 MW station at Machen but when the local authorities and Farmers' Union objected, an inquiry was held and the project was not approved. At that inquiry the Rogerstone site, situated near the Northern Aluminium Co.'s works, was suggested as an alternative as it had been zoned for industrial purposes. No reason for the change of mind of the local council has been given.

The B.E.A. has submitted formal application for planning permission to site the station at Rogerstone and this will be considered by the Monmouthshire County Planning Committee on 2nd November. Mr. James Kegie, Monmouthshire county planning officer, has said that a power station is urgently required for that part of the county.

Electric Cooking Preferred

Tenants at Beccles (Suffolk) were recently canvassed on their preference for gas or electricity for cooking and water heating. Fifty-five were in favour of electricity and only ten asked for gas.

Power Station Accidents

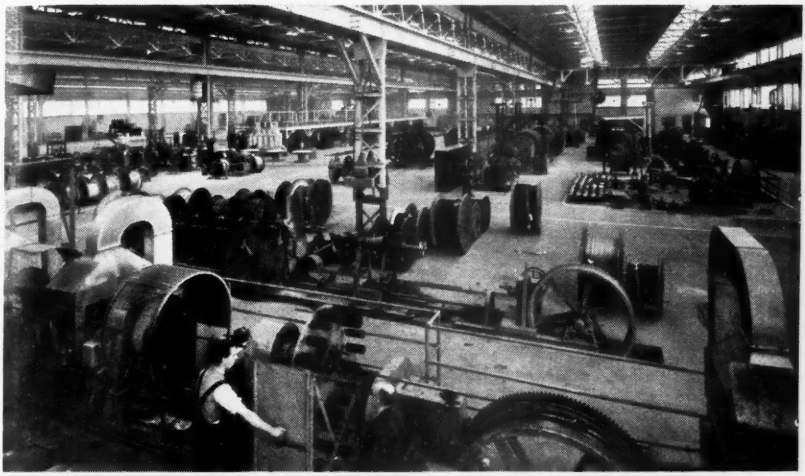
At a recent meeting of the London Building and Engineering Contractors' Accident Prevention Group the problem of accidents during the construction of power stations was raised by Mr. D. Hudson (British Electricity Authority). He said that his Authority was worried about the possibility of at least 300 lives being lost during the next 10 years (at the rate they were experiencing in their Constructional Department work and in their power stations). The Authority took steps to ensure safety on the job but there were also sub-contractors on the sites. There were certain statutory requirements and they might be carried out to the letter but many of the sub-contractors were not subject to statutory requirements at all, such as people building the boilers and even the cooling towers.

Another speaker said that his company had recently handled this problem at a power station. The contractor in charge of the job arranged a meeting between all the contractors on the site to decide upon the appointment of a full-time safety officer. But they all said that they had their own safety officers who would go round from time to time and they would not like a change, with its possible interference. A site safety sub-committee was set up but the attendance was very disappointing.

It was suggested that some sort of safety code on the lines of the Building Regulations could perhaps be drawn up for people involved in the construction of power stations, and representative of their particular trade, but the hon. secretary (Mr. J. A. Hayward) thought that most points were covered by the Building Regulations and possibly there might before long be regulations to cover civil engineering. He suggested the formation of a sub-committee to meet representatives of the B.E.A. in London to discuss the subject.

NEW CABLE FACTORY

Extension of B.I.C.C. Anchor Works



The new B.I.C.C. factory at Leigh, showing, in the foreground, a rubber-insulated wire armoured cable being served. Other cable-making machinery is in the process of being assembled

ONE of the most outstanding problems confronting industry to-day was to meet the ever-increasing world competition in prices, and B.I.C.C. intended to meet this competition by continuing to modernize the whole of its production facilities, said Sir Alexander Roger, K.C.I.E., chairman of British Insulated Callender's Cables, Ltd., when he opened a new 80,000 sq ft extension to the company's Anchor Works at Leigh, Lancs, on 9th October.

The opening ceremony was attended by the Mayor and Town Clerk of Leigh (Councillor J. Stevenson, J.P., and Mr. Albert Jones), and Councillor T. Jameson, Leigh branch secretary of the National Union of General and Municipal Workers. Mr. T. L. Osborne, Leigh works manager, presided. Sir Alexander Roger said that the new factory had been erected specifically to simplify and improve the arrangements for the production of rubber cables.

The site of the new factory is that of the former Leigh rugby football ground at Mather Lane which has been within the boundaries of Anchor Works for some time. The new building, which is of steel frame construction, is approximately 350ft long, and comprises four bays having a height of 28ft to the eaves. Provision is made for four 15-ton cranes running longitudinally, and, at the ends, are one 15-ton and one 5-ton transverse cranes. The main doors are of the electrically-operated, folding type, with two minor doors operated photo-electrically. During the winter the factory will be heated by low pressure steam through thermostatically controlled unit heaters; during the summer months these same units will be used for the distribution of cool air.

Now that the factory is in production, all B.I.C.C. rubber-insulated cables will be manufactured at Leigh, and the new production area will be devoted to lead-covered and armoured cables for colliery, shipping and general industrial purposes. The design of the building, including steelwork, was prepared in the company's Building Department and the erection of the building was carried out to its instructions.

E.P.E.A. (South Eastern Division)

THE annual dinner of the South Eastern Division of the Electrical Power Engineers' Association will be held on 27th November at the Connaught Rooms, Great Queen Street, London, W.C.1. Tickets (members £1 5s, non-members £1 17s 6d) can be obtained from F. H. Smethurst, hon. secretary, South Eastern Divisional Office, 118, New Kent Road, S.E.1.

Financial Section

STOCKS and SHARES

STOCK Exchange matters are largely dominated at the moment by the opening of subscription lists to the issue of 14 million £1 ordinary shares in the United Steel Companies, Ltd. This is, of course, the first step in the operation to sell back to the public the securities taken over by the State on the nationalization of the steel industry in 1951. Success for this issue is widely predicted. The shares are offered on a prospective yield basis of 7¼ per cent, which is about 1½ to 2 per cent more than the present return on many popular industrials. Lists remain open until 9th November. Certain Government stocks may be tendered in payment in lieu of cash, but they do not include the British Electricity stocks, or the securities of the gas and transport industries.

Joseph Lucas

This month's Motor Show serves as a reminder that the final dividend and preliminary figures of Joseph Lucas (Industries) may be expected within a few weeks; the company's financial year ended in July. For the previous year, the total distribution was raised from 1s 6d to 1s 10d per share, and was covered as much as seven times over by the surplus profits available. Although more than £4 million of the reserves was capitalized in the 200 per cent bonus of 1949, their total a year ago had again recovered proportions considerably larger than the nominal capital. For some time the £1 shares have been a persistently good market. The present price of 46s 3d indicates confident anticipation of the coming results, for the yield on the basis of last year's payment is now barely 4 per cent.

E.M.I. Dividend

A warning from the chairman of Electric & Musical Industries at last year's annual meeting had prepared expectation for the reduction in profits now reported by the company. A cut in the ordinary dividend rate from 12 to 8 per cent is larger, however, than had been generally anticipated. The 10s shares have consequently been marked down fairly sharply to 12s 9d, since the publication of the results, which apply to the year ended last June. No information about trading conditions accompanied the figures, so that the market will be left in a state of some uncertainty until the full report makes its appearance.

Bonus Trio

Activity has subsided to some extent in the shares of the three companies—C. A. Parsons, Chloride Electrical Storage and London Electric Wire—whose almost simultaneous declarations of 100 per cent share bonuses enlivened the electrical markets a fortnight ago. Prices have, however, shed little, if anything, of the spectacular rises which preceded and accompanied the announcements. Parsons at 90s lost only 1s 3d of the 14s 9d rise of the previous week, while Chlorides retained their 5s advance to 86s 3d. In the case of London Electric Wire, the official quotation was brought up to 75s 6d.

"Rights" Issues

For each share held, C. A. Parsons' shareholders are to receive one free share by way of bonus, and the offer of another for cash at the obviously generous price of 22s 6d. After deduction of the rights to both issues from the current price of the shares, a future quotation in the neighbourhood of 37s 6d is indicated. The rate of dividend on the trebled capital can be only conjectural, but the market is basing its ideas provisionally on a 7½ per cent distribution. Rights to A. Reyrolle & Co.'s coming issue of one new share at 40s for every two held, are worth about 10s 6d per share on the basis of the present quotation of 72s 6d.

Negotiations

Baird Television (formerly Scophony-Baird) 1s shares have changed hands at prices up to their par value since references at the meeting, held earlier this month, to the possibility of an amalgamation with another firm in the same field. According to the chairman, negotiations are actively in progress. Burco 5s shares have risen 2s 6d to 21s 3d since the company's announcement of negotiations for the acquisition of a small group of private companies. If completed, it is said, the deal would be of considerable and immediate benefit to Burco.

British Aluminium

British Aluminium ordinary shares, now 37s 9d ex-dividend, have recovered much of the setback caused by the statement with which the company accompanied last month's interim dividend declaration. In this, the directors reported little sign of improvement in the difficult trading conditions referred to earlier at the annual meeting. It was emphasized that the maintenance of the interim dividend at 4 per cent, as before, should not be taken as a sign that the total for the year would necessarily be the same as in recent years. Since the end of the war the company has distributed 10 per cent in dividends each year, with the addition of a 2 per cent bonus on the last two occasions.

ELECTRICAL INVESTMENTS

Past Week's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 26th Oct. 1953	Week's Rise or Fall	Est. Yield p.c.
Gilt-edged and Overseas Stocks			£ s d		
Brit. Elec. 1968/73	3	3	89½	—	3 7 0
Brit. Elec. 1974/77	3	3	88½	—	3 7 10
Brit. Elec. 1976/79	3½	3½	93½	—	3 14 9
Brit. Elec. 1974/79	4¼	4¼	103	+½	4 2 6
Calcutta Elec. ..	6†	6†	18/6	—	6 9 9†
East African Power	7	7	22/-	—	6 7 3
Nigerian Elec. ..	10	10	23/6	−6d	8 10 3
Palestine Elec. "A"	5†	Nil	16/6	—	Nil
Perak Hydro-Elec.	Nil	6	16/6	—	7 5 6
Equipment and Manufacturing					
Aberdare Cables (5/-)	20	25	8/6	—	7 7 0*
Aerialite (1/-) ..	83⅓	88⅓	10/-	—	8 16 8
Allen, W. H. ..	15	15	47/6	+6d	6 6 4
Aron Elec. Ord. ..	15	20	42/6	—	9 8 2
Assoc. Elec. Ord.	20	20	42/-	—	4 15 3*
Automatic Tel. & El.	15	15	61/3	—	4 18 0
Babcock & Wilcox	18	18	68/-	−6d	5 6 0
Baldwin, H. J. (2/-)	20	20	4/3	—	9 8 4
Bakelite (10/-) ..	—	12½	24/6	+1/-	5 2 1
British Aluminium	12	12	37/9	—	6 7 4
B.I. Callender's ..	9	10	40/-	—	5 0 0
British Thermostat (5/-)	30	35	18/9	+1/3	—
British Vac. Cleaner (5/-)	25	25	13/6	—	9 5 2
Brook Motors (10/-)	20	20	33/9	—	—
Brush Ord. (5/-) ..	10	4	4/3	—	—
A. F. Bulgin (1/-)	30	30	3/1½	—	9 12 0
Burco (5/-) ..	38¾	35	21/3	+2/6	8 4 9
Chloride El. Storage	15	20	86/3	—	4 12 9
Cole, E. K. (5/-) ..	25	25*	20/-	—	6 5 0
Cossor, A. C. (5/-)	10	10	7/-	+3d	7 2 9
Crabtree (10/-) ..	17½	17½	29/-	—	6 0 8
Crompton Parkinson Ord. (5/-) ..	11¼	11¼	13/-	—	4 6 7
De La Rue (5/-) ..	35	Nil	11/9	+1/-	—
Decca (5/-) ..	112½	150	33/-	+1/6	4 11 0*
Dewhurst (2/-) ..	22½	19*	5/6	—	6 18 3
DictographTel.(2/-)	20	20	5/9	—	—
E.M.I. (10/-) ..	12	8	12/9	−1/9	6 5 6
Electrical Components (5/-) ..	20	20	11/3	+9d	8 17 9
Elec. Construction	15	15	53/9	—	5 11 9
Enfield Cable Ord.	7½	5	22/-	—	4 11 0
English Electric ..	15	15	57/6	+6d	5 4 2
Ericsson Tel. (5/-)	22†	22*†	42/-	—	2 12 4†
Ever Ready (5/-)..	35	35	28/9	+9d	6 1 9
Falk Stadelmann	15	15	44/-	—	6 16 3
G.E.C. Ord. ..	22½	11¼*	38/9	—	5 16 2
General Cables (5/-)	30	30	16/9	—	8 19 2
Greenwood & Batley	15	17½	40/9	—	8 11 9
Hackbridge Cable (5/-)	20	20	12/9	—	7 17 0
Hackbridge Hewittic (5/-)	20	20	17/6	—	5 14 2
Hall Tel. Acc.(10/-)	10	10	11/6	+1/-	8 13 10
Heatrae (2/-) ..	12½	12½	4/-	—	6 5 0
Henleys (10/-) ..	20	10½*	17/6	—	6 0 0
Holophane (5/-) ..	20	20	12/6	—	8 0 0
Hoover (5/-) ..	35	25	26/3	—	4 15 0

Company	Dividend Previous	Dividend Last	Middle Price 26th Oct. 1953	Week's Rise or Fall	Est. Yield p.c.
Equipment and Manufacturing (continued)			£ s d		
Intl. Combustion (5/-)	25	15*	14/3	—	5 5 3
Johnson & Phillips	15	15	53/-	—	5 13 2
Lancashire Dynamo	12½	12½	44/3	—	5 13 0
Laurence, Scott (5/-)	15	15	13/3	—	5 13 2
London Elec. Wire	12½	15	75/6	+4/9	3 19 6
J. Lucas	7½	9½	46/3	+6d	3 19 3
Marryat & S. (2/-)	22½	22½	5/9	—	7 16 6
Mather & Platt ..	12½	15	52/-	—	5 15 5
Metal Industries ..	15	12*	40/9	−3d	5 17 8
Mid. Elec. Mfg. ..	15	15	60/-	—	5 0 0
Murex	15	15	51/-	−1/-	5 17 9
Newman Ind. (2/-)	10	10	2/3	—	8 17 9
Oldham & Son (1/-)	35	17½*	2/6	—	7 0 0
Parnall (Yate) (5/-)	6	6	4/-	+9d	7 10 0
Parsons, C. A. ..	10*	12½	90/-	−1/3	2 15 9
Plessey (5/-) ..	22½	25	30/-	—	4 3 4
Pye Deferred (5/-)	18	20	20/-	—	5 0 0
Revo (10/-) ..	27½	27½	16/9	+6d	—
Reyrolle	10*	12½	72/6	—	3 9 0
Scot. Cable (4/-) ..	32	20*	13/-	—	6 3 0
Siemens Ord. ..	10	10	34/-	−6d	5 17 8
Southern Areas ..	5	6	17/6	—	6 17 3
Strand Elec. (5/-)..	17½	17½	8/3	—	10 12 2
Sturtevant (5/-) ..	17½†	18·1*†	31/-	+3d	2 18 0†
Sun Elec.	15	15	25/-	—	12 0 0
Switchgear & Cowans (5/-)	22½	22½	14/6	—	7 15 2
Taylor, T. (5/-) ..	20	25	21/3	—	5 17 9
T.C.C. (10/-) ..	20	20*	40/-	—	—
T.C. & M. ..	10	8½*	28/6	−6d	5 19 4
Telephone Mfg. (5/-)	10	10	7/9	—	6 9 0
Thorn Elec. (5/-)	10	12½	12/-	+3d	5 4 3
Tube Investments	25	15*	61/6	+1/-	4 3 6
Vactric (5/-) ..	Nil	Nil	7/6	+1/3	—
Veritys (5/-) ..	7½	10	4/6	—	11 2 2
Walsall Conduits (4/-)	70	70*	45/6	+6d	6 3 0
Ward & Goldstone (5/-)	45	45*	41/-	—	5 9 9
Watford (2/-) ..	25	25	5/6	—	—
Westinghouse Brake	14	15	61/3	+3/-	4 18 0
West, Allen (5/-) ..	15	15	12/6	—	6 0 0
Trusts, Transport and Communications					
Anglo-Am. Tel.: A Ord.	—	6	85½	—	7 0 4
Ord.	—	3¾	57½	—	6 10 5
Anglo-Portuguese	8	8	22/3	—	7 3 9
Brit. Elec. Traction: Def. Ord. (5/-)..	25	35	35/-	+6d	5 0 0
Cable & Wireless: Ord.	8	8	140	—	5 14 4
4% Loan ..	4	4	97	—	4 2 6
Calcutta Trams ..	6†	2½†	17/6	—	—
Cape Elec. Trams	5½	5½	9/9	—	11 5 8
Marconi Marine ..	10	10	27/6	—	7 5 6
Oriental Tel. Ord.	16	16	72/6	—	—
Telephone Props.	8	8	5½	+2/6	—
Tele. Rentals (5/-)	10	10*	9/6	—	5 5 3

* After capital bonus. † Dividends are paid free of income tax.

The above quotations are based upon the middle prices given in the Stock Exchange Daily Official List.

REPORTS and DIVIDENDS

Electric & Musical Industries, Ltd., in a preliminary statement, shows trading profits of the company, together with English and British overseas subsidiaries, of £660,039 for the year to 30th June last, as compared with £1,542,877 for 1951-52. After making various deductions, the net profit, before taxation, is £446,921 (against £1,166,865). Taxation absorbs £166,938, and after allowing for amounts retained in subsidiary companies, the balance available in the parent company is £242,793 (against £292,327). It is proposed to pay an ordinary dividend for the year of 8 per cent (against 12 per cent).

The Perak River Hydro-Electric Power Co., Ltd., reports a net profit for the year ended 31st July last, after charging £250,000 for depreciation, of £546,617, as compared with £514,616 for the preceding year, to which is added £103,403 brought in, making £650,020. Of this £387,500 is appropriated for taxation, general reserve receives £15,000 and contingency reserve £50,000. It is proposed to pay a dividend of 5 per cent and a bonus of 1 per cent for the year on the ordinary capital, and to carry forward £106,176. This is the first distribution on the ordinary capital since a similar payment for the year 1940-41.

The Ever Ready Trust Co., Ltd., has announced an interim dividend of 6 per cent (against 5 per cent).

The Ever Ready Co. (Great Britain), Ltd., is paying an unchanged interim ordinary dividend of 15 per cent.

Hopkinsons, Ltd., are paying an interim dividend of 7½ per cent on doubled capital (against 10 per cent).

The Anglo-Portuguese Telephone Co., Ltd., has declared an interim dividend of 3 per cent (unchanged).

T. Clarke & Co., Ltd., are maintaining their interim dividend at 9 per cent.

Vent-Axia, Ltd.—An issue of 60,000 6½ per cent £1 cumulative redeemable preference shares at par to ordinary stockholders has been oversubscribed.

New Companies

Better Electrics, Ltd.—Registered 1st October. Capital £100. Manufacturers of and dealers in electrical goods of all kinds, etc. Directors : R. Nelson-Harris and C. Gee. Regd. office : 1451, London Road, Norbury, S.W.16.

J. G. Hudson, Ltd.—Registered 24th September. Capital £1,000. Television and radio engineers, etc. Directors : J. G. Hudson, P. Dodsworth, Ruby E. Hudson and Rita Dodsworth. Regd. office : 1, Minster Gates, York.

Wyeland Jones (Gloucester), Ltd.—Registered 9th October. Capital £500. Electrical, radio, lighting, telephone, mechanical and general engineers, etc. Directors : W. B. Jones, A. I. H. Coates and A. K. Priday. Regd. office : 23, Nine Elms Road, Longlevens, Gloucester.

G.H.S. Electronics, Ltd.—Registered 10th October. Capital £500. Electrical engineers and contractors, manufacturers of and dealers in and repairers of transformers, etc. Directors : G. Howard-Sorrell and Marjorie E. Howard-Sorrell. Regd. office : 288, Station Road, Harrow, Middx.

Servo & Electronic Sales, Ltd.—Registered 12th October. Capital £500. Manufacturers of and wholesale and retail dealers in and repairers of electrical and mechanical equipment and accessories, particularly motors for servo control purposes, etc. Directors : Ethel J. Egan and Charlotte W. Egan. Regd. office : 1, Hopton Parade, Streatham High Road, S.W.16.

Fluorescent Renewals, Ltd.—Registered 17th September. Capital £500. Manufacturers of and dealers in electrical, fluorescent and other lamps, etc. Directors : A. C. Dibley, J. Rycroft, Mrs. Ruth Dibley and K. Bradley. Regd. office : 72, Granville Road, Cricklewood, N.W.2.

Crockford & Geer, Ltd.—Registered 7th October. Capital £100. Electricians, radio, television and mechanical engineers and manufacturers, etc. Directors : W. G. Crockford and J. W. Richardson. Secretary and solicitor : John W. Richardson, Christchurch.

Liquidations

Electrical Facilities, Ltd.—In voluntary liquidation. Meeting of members on 27th November at 17, St. Helen's Place, London, E.C.3, to receive an account of the winding-up by the liquidator, Mr. P. Ewen, pursuant to section 290 of the Companies Act, 1948.

Hallicrafters Gt. Britain, Ltd.—Referring to a note in the *Electrical Review* of 16th October reporting that a liquidator has been appointed by the members of this company, Mr. H. R. Adams, managing director of the McElroy-Adams Mfg. Group, Ltd., says that he was the founder member responsible for floating Hallicrafters Gt. Britain, Ltd., the other major shareholder being the Hallicrafters Co., Chicago. In view of dollar restrictions, it was mutually considered not expedient for Hallicrafters Gt. Britain, Ltd.,

to trade and, therefore, all shares were purchased by Hallicrafters in Chicago. The company has never traded, has no creditors and no liabilities, and the liquidation notice does not in any way affect the McElroy-Adams Mfg. Group who are the distributors of Hallicrafter American communication equipment.

Bankruptcies

R. **E. Browne,** electrical contractor, carrying on business under the style of Browne Brothers, at 121, Market Street, Dalton-in-Furness.—First and final dividend of 4s 1d in the £, payable at the Official Receiver's office, 14, Lowther Street, Carlisle.

L. **L. O'Connor,** 27, Wellington Square, London, S.W.3, electrical engineer, described in the receiving order as Leo O'Connor (trading as Paragon Electrical), electrical and radio contractor.—Trustee, Mr. F. H. Langmaid, Bankruptcy Buildings, Carey Street, London, W.C.2, Official Receiver, released 16th October, 1953.

A. J. Martin, residing at 202, Putney Bridge Road, Putney, London, and lately carrying on business at High Street, Stalham, Norfolk, electrical engineer and wireless dealer.—Trustee, Mr. F. R. D. Walter, Castle Chambers, Opie Street, Norwich, Official Receiver, released 16th October, 1953.

I. F. Berners and **C. J. Berners,** trading and described in the receiving order as Major Manufacturing Co., 98, Great Tower Street, London, E.C., battery manufacturers. —Last day for receiving proofs for dividend 7th November. Trustee, Mr. F. H. Langmaid, Bankruptcy Buildings, Carey Street, London, W.C.2, Official Receiver.

Australian Overseas Trade

IMPORTS of electrical machinery, appliances and equipment into Australia during the nine months ending March last totalled £A20,165,000 in value, compared with £A25,743,000 during the corresponding period of 1951–2. From the accompanying table showing the chief groups it will be seen that the only items which did not share in the decline were cable, transformers and rectifiers.

Class of Goods	Nine months ended March	
	1952 £A (000)	1953 £A (000)
Batteries and accumulators ..	728	267
Cable and wire, covered ..	2,348	2,750
Communication equipment, including radio	4,699	2,256
Dynamo-electric machines ..	5,764	4,976
Heating and cooking appliances	1,554	205
Lamps, filament	937	221
Protective equipment	751	588
Regulating, starting and controlling equipment	3,827	3,870
Sparking plugs	534	223
Transformers and rectifiers ..	2,618	3,198
Electrical machinery and appliances, n.e.i.	1,983	1,611

During the same period Australian exports of dynamo-electric machinery and electrical appliances and equipment totalled £A1,235,000 in value compared with £A1,360,000 during the corresponding period of 1951–52. The total included batteries and accumulators £A233,000 and communication equipment £A371,000.

Some figures of Australian production of electrical apparatus are available for the nine months ended March last. The number of motors then turned out was 356,900 compared with 439,700 in the corresponding period of 1951–52 and fewer than in any period since 1948–49. Domestic refrigerators totalled 138,700 compared with 158,300 in January–September 1951–52, while electric cooking stoves (excluding "stovettes," etc.) numbered 46,400 against 41,500.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 7th November.

JP or J. & P. (design). Nos. 700,466, 700,472, 700,478, 700,484, 700,496, Class 6. Fittings (not being electrical goods) of common metal and included in Class 6 for use in connection with electrical wiring and transmission installations. Nos. 700,467, 700,473, 700,479, 700,485, 700,497, Class 7. Dynamos, electric motors (not for land vehicles) and cable laying machinery. Nos. 700,468, 700,474, 700,480, 700,486, 700,498, Class 9. Electrical instruments and apparatus, parts and fittings, all included in Class 9 and being for use in connection with electric wiring and transmission installations; and transformers, switchgear, fuses included in Class 9, capacitors, cable junction boxes of metal, lightning arrestors, cables, gramophone pick-ups, loudspeakers, public address apparatus, electric-arc welding apparatus and instruments and apparatus for testing electrical equipment. Nos. 700,470, 700,488, 700,476, 700,482, 700,500, Class 11. Electric lighting fittings included in Class 11; and arc lamps and electric water heaters. Nos. 700,471, 700,501, 700,477, 700,483, 700,489, Class 17. Insulators, insulating materials, and jointings (packings), all for use in connection with electric wiring and transmission installations.—Johnson & Phillips, Ltd., Victoria Way, Charlton, London, S.E.7.

CYLDON TELETUNER. No. 717,646, Class 9. Electrical apparatus for incorporation in television transmitters and television receivers to permit the transmission and reception of oscillations of varying wavelengths.—Sydney S. Bird & Sons, Ltd., 660, Cambridge Arterial Road, Enfield, Middlesex.

TELOPROMPTER. No. 716,039, Class 9. Electrically-operated sound-reproducing apparatus for use in giving speakers and actors their cue, and parts in Class 9 of such apparatus.—Teleprompter Corporation, New York, U.S.A. Address for service, c/o Cruickshank & Fairweather, 29, Southampton Buildings, Chancery Lane, London, W.C.2.

STANTELUM. No. 721,105. STANTELITHIC. No. 721,106, Class 9. Electric capacitors (condensers).—Standard Telephones & Cables, Ltd., Connaught House, 63, Aldwych, London, W.C.2.

SONICUR. No. B719,340, Class 10. Instruments and apparatus for giving medical treatment by means of ultrasonotherapy.—Ateliers de Constructions Electriques de Charleroi, Brussels, Belgium. Address for service, c/o Feeny & Feeny, 2A, Charlwood Place, Westminster, London, S.W.1.

Boards' Activities

SOUTH EAST SCOTLAND

SPECIAL attention is paid by the South East Scotland Electricity Board to encouraging greater off-peak use of electricity. Referring to this in its 1952–53 report, the Board says that the results so far obtained with floor warming are encouraging. Buildings completed during the year in which this method of heating has been adopted include the Sighthill Health Centre, Edinburgh (see *Electrical Review*, 24th July, 1953), and the Board's East Carmuirs offices and stores. Provision is made for floor warming in a number of other buildings under construction, including offices, schools and private houses.

At the end of the year the Board introduced new commercial tariffs one of which was for off-peak supplies (up to 50 kW) for heating, night baking, battery charging and floodlighting or similar purposes, the rate being ¾d./kWh. An annual rental is charged for a time switch, and any ancillary apparatus necessary to control the supply must be provided by the consumer.

The Board reports that its contract maintenance scheme is being increasingly used by domestic consumers. Under the scheme, covering nearly all domestic appliances, a repair and maintenance service is offered for a fixed annual sum.

New consumers connected last year numbered 18,951 (against 16,204) of whom 17,703 were domestic. Sales increased by 4·8 per cent.

SOUTH WEST SCOTLAND

New consumers connected by the South West Scotland Board last year numbered 22,730. This total included 681 farms, more than in any previous year; the number now served (6,485) represents 67 per cent of all the farms in the Area. Sales of electricity to farms last year amounted to 45 million kWh, an increase of 18·3 per cent.

As in S.E. Scotland, a restricted-hour tariff was introduced towards the end of the year, particularly for consumers taking supplies under the industrial and commercial block tariffs, and the Board also announced that it was prepared to entertain applications from industrial users supplied under its industrial two-part m.d. tariff for reduced rates for off-peak supplies in the form of a lower kilowatt charge. Recently the Board has announced a concession for high load factor use.

Considerable progress was made during the year in the field of public lighting. At the end of March there were 105,881 public lamps in the Area of which 80,967 (76 per cent) were electric. Plans have already been made to convert 11,820 of the remaining 24,914 gas lamps.

Work to the value of £2,366,537 was carried out on general system development. Supplies to 4,660 consumers were changed over from d.c. to a.c. and it is expected that nearly all the remaining 1,909 d.c. consumers (out of 24,103 at vesting date) will be converted by March next. Since nationalization 500,000 meters have been certified and this work has now been practically completed. A programme of re-certification on a 20-year basis has been started.

Consultative Council Topics

SO that its activities shall become more widely known, the SOUTH EASTERN ELECTRICITY CONSULTATIVE COUNCIL is arranging its quarterly meetings in different towns in the area and last week visited Reigate. Among the subjects discussed was the payment of capital contributions for an electricity supply. In one case referred to four residents had paid a total of £950 and since then the premises of another resident, who at the time had refused to contribute, had been connected free of charge. The chairman (Cmdr. D. S. E. Thompson) explained that under the Electric Lighting (Clauses) Act, 1899, a supply had to be given to premises within 50 yd of the mains. He agreed to take the matter up at a meeting with the chairmen of other Consultative Councils.

A member spoke of complaints about the Board's " brilliantly lighted " showrooms, which were thought to be expensive. The chairman gave an assurance that the Board's policy was to maintain showrooms only where there was clearly shown to be a need. Another member deprecated the closing of any showrooms, stressing their importance in promoting the sale of electricity which was the best way to reduce the cost. It was also desirable to set an example in good lighting.

The MERSEYSIDE AND NORTH WALES ELECTRICITY CONSULTATIVE COUNCIL at a meeting at Chester on 22nd October discussed the standard domestic tariff. The chairman, Mr. H. Evans, moved a resolution stating that the Consultative Council recognized that to make alterations to the structure of the tariff, such as the elimination of kitchen sculleries, would necessitate an adjustment either in the number of primary units per room or the unit charge, and, having in mind that the tariff compared favourably with those in other areas throughout the country, considered that it would be unwise to request any alteration in the tariff at the present time. The resolution was carried by 19 votes to three. Mr. W. Gilchrist (chief commercial officer, Merseyside and North Wales Electricity Board) said during the discussion that the three major problems to-day were: (1) definition of a kitchen; (2) unwired rooms; and (3) assessment of large houses occupied by perhaps only two people. It was felt that the Board had made the fairest assessment possible by including the kitchens in the tariff structure.

NEXT WEEK'S EVENTS

Monday, 2nd November

BIRMINGHAM.—James Watt Institute, Great Charles Street, 6 p.m. I.E.E. South Midland Centre. "The Co-ordination of Insulation of High-Voltage Electrical Installations," by J. S. Cliff, and "Electrical Discharges in Air Gaps Facing Solid Insulation in High-Voltage Equipment," by Dr. E. Friedlander and J. R. Reed.

CARDIFF.—At the S. Wales Institute of Engineers, Park Place, 6 p.m. I.E.E. Western Supply Group. "Design Features of Certain British Power Stations," by S. D. Whetman and A. E. Powell.

ILFORD.—Angel Hotel, 8 p.m. A.S.E.E. North East London Branch. "Electrical Engineering as Applied to Dockyards," by F. W. Sheppard.

IPSWICH.—Crown & Anchor Hotel, 6.30 p.m. I.E.E. Ipswich district meeting. "The Electricity Division of the National Physical Laboratory," by R. S. J. Spilsbury.

LIVERPOOL.—At the Royal Institution, Colquitt Street, 6.30 p.m. I.E.E. Mersey and North Wales Centre. "Radio Telemetering," by J. Walsh.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "Development of Electrical Aids in A.A. Gunnery," by D. H. A. Huddart.

MAIDSTONE.—"Wig and Gown," 7.30 p.m. I.E.E. Maidstone district meeting. "Electricity in Farm Crop-Drying," by C. A. Cameron Brown and P. G. Finn-Kelcey.

NEWCASTLE-UPON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio & Measurements Group. "Transformer—Analogue Network Analysers," by M. W. Humphrey Davis and Dr. G. R. Slemon.

Royal Turk's Head Hotel. North East Electrical Club. "Electrical Engineering in Iron and Steel Works," by J. Higson.

SHEFFIELD.—Royal Victoria Station Hotel, 7.30 p.m. A.S.E.E. Sheffield Branch. "Miniature Circuit Breakers," by H. W. Wolff.

Tuesday, 3rd November

CAMBRIDGE.—Cambridgeshire Technical College, 6 p.m. I.E.E. Cambridge Radio Group. Address by the chairman of the Radio Section, J. A. Smale.

EDINBURGH.—Carlton Hotel, North Bridge, 7 p.m. I.E.E. South-East Scotland Sub-Centre. "Certain Aspects of Solid State Physics in Electro-Photography," by W. D. Oliphant.

ELTHAM.—Congregational Church, Court Road, 8 p.m. A.S.E.E. South East London Branch. "Electrical Safety," by S. J. Emmerson.

HAMMERSMITH.—Windsor Castle Hotel, 7.30 p.m. A.S.E.E. West London Branch. "Back Pressure Steam Turbo-Alternator Sets for Electrical Generation," by D. N. de Mattos.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Measurements Section. Discussion on "Standardized Protective Transformers from the Point of View of Maker and User," opened by H. S. Petch and J. G. Wellings.

At the Royal Society of Arts, John Adam Street, Adelphi, Strand, 7 p.m. Incorporated Plant Engineers, London Branch. "The Functions of Materials Handling in Industry," by L. Landon Goodman.

LOUGHBOROUGH.—The College, 6.30 p.m. I.E.E. East Midland Centre. "Electricity Supply—A Statistical Approach to Some Particular Problems," by R. B. Rowson.

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Centre. "Economic Aspects of Overhead Equipment for D.C. Railway Electrification," by O. J. Crompton and G. A. Wallace.

Wednesday, 4th November

EDINBURGH.—12, Rothesay Place, 7 p.m. I.E.S. Edinburgh Centre. "Docks and Railway Lighting," by W. T. F. Souter.

GLASGOW.—39, Elmbank Crescent, 7 p.m. I.E.E. South West Scotland Sub-Centre. "Electrotechnical Ceramics—A Survey of Compositions, Manufacturing Methods and Properties," by W. G. Robinson and E. C. Bloor.

HARRINGAY.—"Queen's Head," 677, Green Lanes, N.4, 7.45 p.m. A.S.E.E. North London Branch. "Magnetic Amplifiers," by Dr. Vos Smith.

MIDDLESBROUGH.—Cleveland Scientific & Technical Institute, 6.30 p.m. I.E.E. Tees-Side Sub-Centre. "A Brief Review of the Engineering Problems Associated with the Integration of the Undertakings in the N.E. Electricity Board's Area of Supply," by T. M. Ayres.

NEWCASTLE-UPON-TYNE.—Roadway House, 8, Oxford Street, 6.15 p.m. I.E.S. Newcastle Centre. "Shipyard Lighting," by J. S. McCulloch.

PRESTON.—Chamber of Commerce, 49a, Fishergate, 7.30 p.m. A.S.E.E. Preston Branch. "Cable Jointing," by E. P. G. Thornton.

SOUTHAMPTON.—The University, 6.30 p.m. I.E.E. Southern Centre. "High-Voltage Rubber Insulated Submarine Power Cables," by H. B. Slade, presented by Dr. L. G. Brazier.

SWANSEA.—Plaza Buildings, The Kingsway, 6.30 p.m. I.E.S. Swansea Group. "Coronation Illumination with Special Reference to Colour."

Thursday, 5th November

CARDIFF.—S. Wales Electricity Board, The Hayes, 5.45 p.m. I.E.S. Cardiff Centre. "Miniature Lamps and Special Applications," by W. A. Kimber.

CHELTENHAM.—Cadena Café, High Street, 6.30 p.m. I.E.S. Gloucester and Cheltenham Centre. "New Lamps, New Uses and Techniques," by R. V. Mills.

CROYDON.—Café Royal, North End, 8 p.m. A.S.E.E. South London Branch. "Electrical Maintenance," by P. H. Usher.

EDINBURGH.—University, 7 p.m. British Institution of Radio Engineers, Scottish Section. "Vibration Generators—their Ancillary Equipment and Application," by H. Moore. Annual general meeting at 6.30 p.m.

GLASGOW.—39, Elmbank Crescent, 6.30 p.m. I.E.S. Glasgow Centre. "Plant Cultivation and Artificial Light," by J. B. R. Anderson.

LIVERPOOL.—M.N.W.E.B., Whitechapel, 7 p.m. British Institution of Radio Engineers, Merseyside Section. "Multi-Channel Tuners for Television," by S. L. Fife and W. E. Hosey.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. "The Co-ordination of Insulation of High-Voltage Electrical Installations," by J. S. Cliff.

At the Institution of Mechanical Engineers, Storey's Gate, 5.30 p.m. Institute of Fuel. "French Power Resources and their Utilization," by J. Couture.

PETERBOROUGH.—Eastern Gas Boards' demonstration theatre, Church Street, 7.30 p.m. Incorporated Plant Engineers, Peterborough Branch. "The Heat Pump."

Friday, 6th November

BIRMINGHAM.—Regent House, St. Phillip's Place, Colmore Row, 6 p.m. I.E.S. Birmingham Centre. "Radiation from Space," by M. C. Johnson.

LIVERPOOL.—9, Whitechapel, 7.30 p.m. A.S.E.E. Liverpool Branch. "Consumers' Substations," by K. Helliwell and W. J. Foster.

SWANSEA.—Langland Bay Hotel. I.E.E. West Wales (Swansea) Sub-Centre. Annual dinner and dance.

Royal Institution, Victoria Road, 6 p.m. Institute of Fuel, South Wales Section. "Development of the Electrical Industry in S. Wales," by H. J. Bennett.

Friday, 6th November, and Saturday, 7th November

LONDON.—Central Hall, Westminster, S.W.1. London Electricity Sports and Social Association. Arts and Crafts Exhibition.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 9th December from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1948

13742. Marconi's Wireless Telegraph Co., Ltd., and Cooper, V. J.—Thermionic valve circuit arrangements. 19th January, 1949. (700671.)

21981. Standard Telephones & Cables, Ltd.—Localizer beacon system. 20th August, 1948. (700601.)

1949

1085. Standard Telephones & Cables, Ltd.—Radio navigation system. 14th January, 1949. (700602.)

19771 & 3. General Electric Co., Ltd., and Jackson, K.—Manufacture of alloys. 27th July, 1950. (700605 & 7.)

19772. M-O Valve Co., Ltd., and Wright, D. A.—Thermionic cathodes and materials therefor. 27th July, 1950. (700606.)

23643. Modinstal Electric Co., Ltd., and Malins, E. C.—Electric infra-red heat generators. 1st September, 1950. (700603.)

1950

846. General Electric Co., Ltd., Miles, E. E., and Souter, L. S.—Arrangements comprising conducting layers on insulating surfaces. 29th December, 1950. (700851.)

13848. British Thomson-Houston Co., Ltd.—Luminaires. 2nd June, 1950. (700748.)

27076. General Electric Co., Ltd., and Curtis, T. J.—Electric fans. 30th October, 1951. (700684.)

29864. International Business Machines Corporation.—Electronic-multiplying apparatus. 6th December, 1950. (700691.)

30479. Rolls-Royce, Ltd.—Electromagnetic devices. 5th November, 1951. (700762.)

31647. National Research Development Corporation.—Electromagnetic relays. 12th December, 1951. (700627.)

1951

3884. Elliott Bros. (London), Ltd.—High-frequency radio aerials. 15th February, 1952. (700868.)

5286. General Electric Co., Ltd., and Aspin, J. J. E.—Bandpass electrical filter circuits for use at high frequencies. 24th January, 1952. (700871.)

5901. Babcock & Wilcox Co.—Electrical control systems. 12th March, 1951. (700633.)

6136. Schunk & Ebe Ges.—Trolley brushes for electric vehicles. 14th March, 1951. (700815.)

6939. Happel (née Schulenberg), E. F.—Air-cooled condenser for steam power plants, particularly for large plants. 22nd March, 1951. (700872.)

11194. General Electric Co., Ltd., and Garthwaite, F. N.—Electrical apparatus. 12th May, 1952. (700819.)

12584. Metropolitan-Vickers Electrical Co., Ltd.—Aerodynamic instruments. 1st April, 1952. (700877.)

14614. Imperial Chemical Industries, Ltd.—Ventless short period delay electric detonators. 13th February, 1952. (700638.)

15799. Carr Fastener Co., Ltd.—Mounting strips for electrical wiring tags. 14th May, 1952. (700716.)

17879. Metropolitan-Vickers Electrical Co., Ltd.—Electric-discharge devices. 15th July, 1952. (700719.)

18429. English Electric Co., Ltd.—Dust separators. 11th July, 1952. (700791.)

19153. Sangamo Weston, Ltd.—Automatic electric control, detection or measuring systems and instruments for use therein. 20th February, 1952. (700643.)

19934. Raduner & Co. Akt.-Ges., and Berlepsch-Valendas, W. von.—Installations for continuous heat treatment of textiles by infra-red rays. 23rd August, 1951. (700883.)

21851. Forges et Ateliers de Constructions Electriques de Jeumont.—Illuminating systems for signs or display panels. 18th September, 1951. (700829.)

23234. English Electric Co., Ltd.—Control systems for dynamo-electric machines. 26th September, 1952. (700831.)

23466. Western Electric Co., Inc.—Electric signal translating circuits. 9th October, 1951. (700890.)

23864. Sylvania Electric Products, Inc.—Method of eliminating phosphor discoloration in cathode-ray tubes. 12th October, 1951. (700725.)

24505. Parsons, J. B.—Three-position electric switches. 19th October, 1951. (700726.)

25114. British Insulated Callender's Cables, Ltd.—Electric cables. 24th October, 1952. (700648.)

26155. British Driver-Harris Co., Ltd.—Copper-nickel electrical resistance alloys. 8th November, 1951. (700650.)

26267. Heinrich, R. F.—Vertical electro-precipitators. 9th November, 1951. (700651.)

28044. Metropolitan-Vickers Electrical Co., Ltd.—Pyrometers. 24th September, 1952. (700838.)

29105. British Thomson-Houston Co., Ltd.—Frost indicator for refrigerators. 12th December, 1951. Addition to 688190. (700655.)

29191. Philips Electrical Industries, Ltd.—Interconnecting devices for high-frequency currents. 13th December, 1951. (700893.)

1952

362. E.V.G. Entwicklungs- und Verwertungsges.—Spot welding apparatus. 4th January, 1952. (700732.)

2247. Forges et Ateliers de Constructions Electriques de Jeumont.—Control of low-speed induction motors. 28th January, 1952. (700894.)

2858. Sulzer Frères Soc. Anon.—Thermal plants operating with liquid fuel. 4th February, 1952. (700662.)

4985. Etablissements Merlin & Gnerin Soc. Anon.—Device for the distribution of compressed air to an air-blast electric circuit breaker and its isolator. 26th February, 1952. (700895.)

5665. General Electric Co., Ltd., and Forbes, W. A.—Telephone systems. 11th February, 1953. (700844.)

9069. Brush Development Co.—Piezo-electric device. 9th April, 1952. (700896.)

9143. Soc. des Electrodes de la Savoie.—Ultra-refractory products and methods of manufacture thereof. 9th April, 1952. (700790.)

10187. Alimanna Svenska Elektriska Aktiebolaget.—Regulating device for Ward-Leonard control system. 23rd April, 1952. (700897.)

11839. Busch-Jaeger Lüdenscheider Metallwerke Akt. Ges.—Electrical rotary switches. 9th May, 1952. (700737.)

13089 & 13092. United States Rubber Co.—Battery separator. 23rd May, 1952. (700665/6.)

21329. Vigren, S. D., Broberg, O. W., and Zander, R. A.—Electrical control magnets. 25th August, 1952. (700738.)

25432. Philips Electrical Industries, Ltd.—Circuit arrangements for frequency changing of high-frequency oscillations. 10th October, 1952. (700849.)

27622. British Thomson-Houston Co., Ltd.—Glass tube reshaping apparatus. 3rd November, 1952. (700850.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Belfast.—4th December. Electricity Department. Fire fighting equipment. (See this issue.)

Belgian Congo. — LEOPOLDVILLE. — 20th November. M. le President du Conseil Adjudications du Gouvernement-General. Four 50 kVA and four 30 kVA diesel or petrol auxiliary generating sets, and nine 15 kVA diesel generating sets. (E.S.B. 6738/53. Ten/7393.)*

Belgium. — BRUSSELS. — 3rd November. Belgian Ministry of National Defence. Spares for radar equipment. (E.S.B. 7181/53. Ten/7361.)*

Dagenham. — 1st January. Corporation. Traffic control equipment. (See this issue.)

Durham.—9th November. County Education Committee. Electrical installations in schools: Shotley Bridge County, Fishburn County, Tow Law County, Hartlepool Throston Nursery, Boldon Colliery Modern, Felling Falla County, High Felling County, Sherburn Hill County and Hartlepool Galleys Field Modern. County architect, Court Lane, Durham.

Egypt. — CAIRO. — 2nd December. Director General, Cairo Electricity and Gas Administration. L.v. cables. (See this issue.)

Fermanagh.—10th November. County Education Committee. Electrical installation (lighting, heating and power) at Kesh Primary School. H. M. Jones, A.R.I.B.A., 27, High Street, Enniskillen, Co. Fermanagh.

Greece.—ATHENS.—1st December. Ministry of Communications. Telecommunications equipment (E.S.B. 7003/53. Ten/7401.)*

Hastings.—Corporation. Electrical installation at St. Leonards Secondary Modern School for Boys. (See this issue.)

India.—MADRAS.—15th November. Government Electricity Department. Air conditioning plant and associated equipment for the control room at the Basin Bridge "B" power station, Madras. (E.S.B. 7058/53. Ten/7364.)*

NEW DELHI.—24th November. Director General of Supplies and Disposals. 250 V and 660 V cables. (E.S.B. 7132/53. Ten/7409.)*

London.—27th November. India Store Department. Radio installation kits. (See this issue.)

New Zealand.—WELLINGTON.—17th November. Director-General (Stores Division), G.P.O. 2,200 fuse mountings. (E.S.B. 6748/53. Ten/7357.)*

9th February. State Hydro-Electric Department. One 5 MVA transformer unit. (E.S.B. 7350/53. Ten/7398.)*

*Specifications may be inspected at the Export Services Branch, Board of Trade, Lacon House, Theobald's Road, London, W.C.1 (Chancery 4411; extension 769).

Newcastle-on-Tyne. — 18th November. City Council. Electrical installations in 81 houses on the Kenton North Estate. City architect, 18, Cloth Market.

Northampton.—23rd November. Corporation. Electrical services in the Guildhall. (See this issue.)

Peterborough. — City Council. Electrical installations in 90 houses and 8 old people's dwellings. (See this issue.)

Richmond (Yorks).—9th November. R.D.C. Two electrically operated pumping sets for regional water supply scheme. A. Brooksbank, consulting engineer, 14, The Exchange, Bradford.

Rothbury.—3rd November. R.D.C. Electrical installations in 20 houses. Surveyor, Council Offices.

United States. — DENVER (COLORADO). — 17th November. Switchgear and switchboard for Chandler power plant. (E.S.B. 6962/53. Ten/7359.)*

Uruguay. — MONTEVIDEO. — 9th November. Administracion Municipal de Transportes Colectivos. 10,650 lamps. (E.S.B. 7314/53. Ten/7392.)* 10th November. 30,000 lamps. (E.S.B. 7310/53. Ten/7391.)*

ORDERS PLACED

Belfast.—Corporation Electricity Committee. Accepted. Supply and installation of cables and accessories (£323,864).—W. T. Henley's Telegraph Works Co., Ltd.

Newcastle-on-Tyne.—City Council. Four electric travelling cranes for Newcastle Quayside. —Cowans Sheldon & Co., Ltd.

Housing Committee. Electrical installations in 1,284 flats on the Longbenton estate.—Tanjon (Newcastle), Ltd.

Sunderland.—Town Council. Internal electric wiring of 263 houses (£5,955).—J. Calvert.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bexhill-on-Sea.—Milk processing dairy and offices, Terminus Road; Sandhall & Sidley Farms, Ltd., 80a, London Road.

Brighton.—Factory extension at Hollingbury for Leytonstone Jig & Tool Co., Ltd.; town clerk.

Houses (58), site Nos. 4 and 6, Hollingbury estate; borough engineer and surveyor, 26-30, King's Road, Brighton 1.

Experimental type houses (120), off Birdham Road; T. J. Braybon & Son, Ltd., Brighton.

Cardiff.—Air terminal building and bus station, Wood Street; city surveyor.

Coleshill.—Extensions and alterations at the Old Vicarage to form new offices (£68,000); R.D.C. surveyor, Council Offices, Coleshill.

Coventry. — Factory, Torrington Avenue; Britannia Tool Co., 58, Cox Street.

Houses (123), Willenhall neighbourhood; Coventry & District Building Trades Association, 141, Warwick Road.

Crewe.—Hostel for County Training College (£79,226); county architect, The Castle, Chester.

Darlington.—Second stage of scheme for alterations to the transport depot (£13,500); borough architect, Central Buildings.

Doncaster. — Pig market, Dockin Hill (£43,000); borough architect, 15, South Parade.

Houses (90), Awkley, Edenthorpe, Norton, Warmsworth and Blaxton (£116,911); R.D.C. architect, Doncaster.

Enfield.—Factory, Great Cambridge Road; Chamberlain Industries, Ltd., Staffa Road, E.10.

Twelve shops and 20 maisonnettes, Bullsmoor Lane; Allen Fairhead & Sons, Ltd., Sydney Road.

Esher. — Central library, Esher Lodge vicinity; J. Harrison, county architect, County Hall, Kingston-on-Thames.

Hinckley.—Baptist church, Sketchley Hill; Pick, Everard, Keay & Gimson, architects, 6, Millstone Lane, Leicester.

Hull.—Factory, Reform Street; Markwell, Holmes & Hayter, Ltd., 198, Albert Avenue.

Keighley.—Showrooms and offices; Emu Wools, Ltd., Lower Street Mills.

London. — BERMONDSEY. — Flats (80), Raymouth Road; Stock, Page & Stock, architects, Fanshaw House, Fanshaw Street, N.1.

BLOOMSBURY.—Health centre, Guildford Place; F. J. Moreton & Son, Ltd., builders, 171, Gipsy Road, S.E.27.

DEPTFORD.—Shops (14), maisonnettes (14) and flats (30), Evelyn Street; town clerk, Deptford Town Hall, New Cross, S.E.14.

POPLAR.—Flats (30), Chipka Street; A. E. Symes, Ltd., builders, 1a, Carpenters Road, E.15.

Loughborough. — Completion of training college extensions (£35,000); county architect, Leicester.

Luton.—College of Further Education; Norman & Dawbarn, architects, 5, Gower Street, W.C.1.

Factory, Arundel Road; H. C. Janes, Ltd., 189, Hightown Road.

Manchester. — Showrooms and offices, Princess Street; Robert Carlyle & Co., Ltd., Elsinore Road, Trafford Park.

Extensions at Ladybarn County Secondary School, Parrs Wood Road North, Withington, and Alma Park School, Errwood Road, Levenshulme; city architect.

Newcastle-on-Tyne. — Church, Creighton Avenue; Newcombe & Newcombe, architects, 23, Eldon Square, Newcastle.

Houses, Stanway Drive (38), Whitton Place (16) and Bavington Drive (12); Dryden & Shaw, Market Street.

Northallerton.—Conversion scheme at 171-3, High Street, to form departmental stores; F. W. Woolworth & Co., Ltd., 1, New Bond Street, London, W.1.

Oldbury.—Flats and maisonnettes (183), in five-storey blocks, Titford estate; Kenneth Pearce, Town Clerk, Municipal Buildings.

Plymouth.—Fire stations on sites at Crownhill and Camel's Head (£84,000); borough surveyor, Guildhall.

Preston.—Aged persons' hostel, Gammull Lane (£25,500); borough surveyor.

Reading.—Factory, Basingstoke Road estate; Ipscol, Ltd., 29, Woburn Place, W.C.1.

Houses (114), Home Farm estate; borough architect.

Housing estate, Grosvenor Road; James T. Cook & Sons, Ltd., 11, Holmes Road.

First phase of scheme for grammar school (£119,500); county architect, Parkside Road, Reading.

Redditch.—Adaptation of two blocks at Abbey Hostel to form 18 dwellings; borough surveyor.

Rochdale.—Dwellings (92), Kirkholt estate; J. Hobson & Sons, Ltd., Drake Street.

Rugby.—Houses (240), Abbotts Farm estate; borough surveyor, Burford House, Church Walk.

Sheffield.—Warehouse, foundry, offices, etc., Stevenson Road; John M. Moorwood, Ltd., ironfounders, Stevenson Road, Attercliffe, 9.

Smethwick.—Four-storey block of dwellings at West End Avenue; borough surveyor.

Stanley (Co. Durham). — Bus station; U.D.C. surveyor.

Stockton-on-Tees. — Swimming baths; borough engineer, Victoria Buildings.

Stoke-on-Trent. — Houses (99), Bentilee Farm estate; city architect.

Sunderland.—Bus garage, Toward Street, for United Automobile Services, Ltd.; A. A. Briggs, architect, 10, Fleet Street, London, E.C.4.

Sutton Coldfield.—Police headquarters in conjunction with scheme for new court premises at The Rookery site; county architect, Shire Hall, Warwick.

Warrington.—Old people's home at Orford; borough engineer.

West Bromwich.—Reconstruction of baths in Lombard Street (£46,830); H. Schofield, borough surveyor, Town Hall.

Secondary school, Churchfields; Richard Sheppard & Partners, architects, 16, Bedford Place, W.C.1.

Worksop.—Secondary technical school; Eberlin & Darbyshire, architects, 3, College Street, Nottingham.

Yeovil.—Pumping station and treatment buildings for sewage scheme; Herbert Lapworth Partners, consulting engineers, 25, Victoria Street, S.W.1.

York.—Flats (26), Navigation Road; city architect.